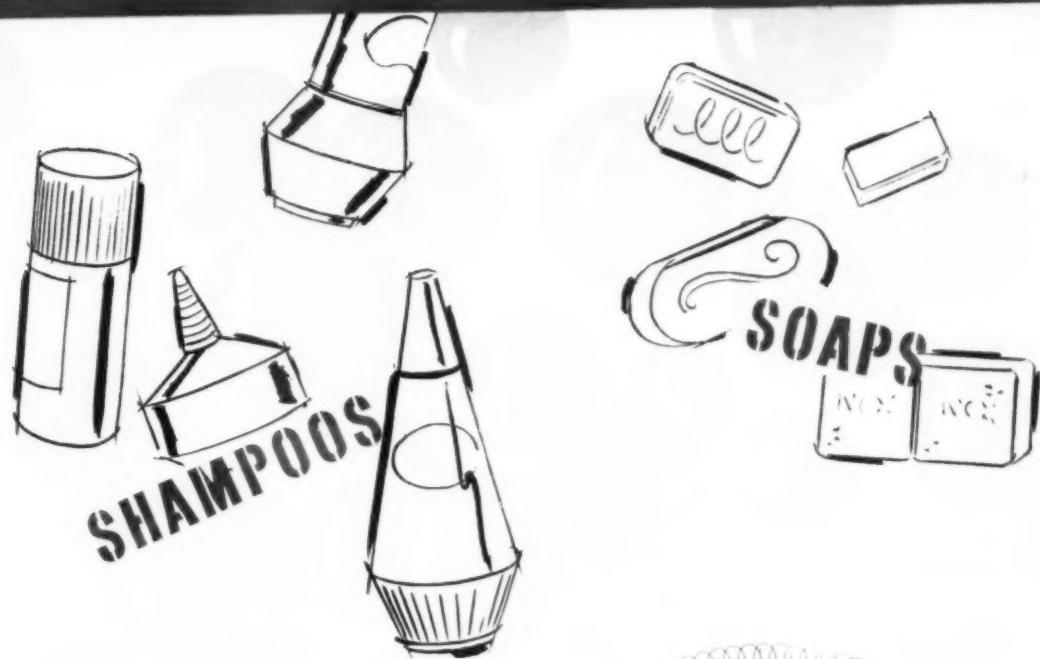
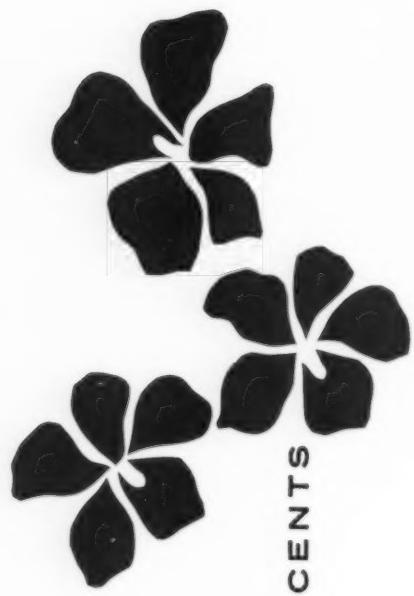


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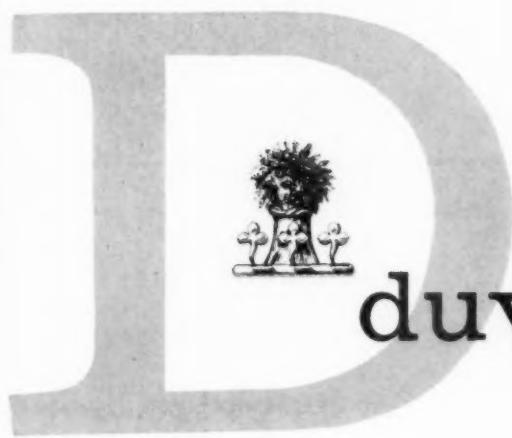
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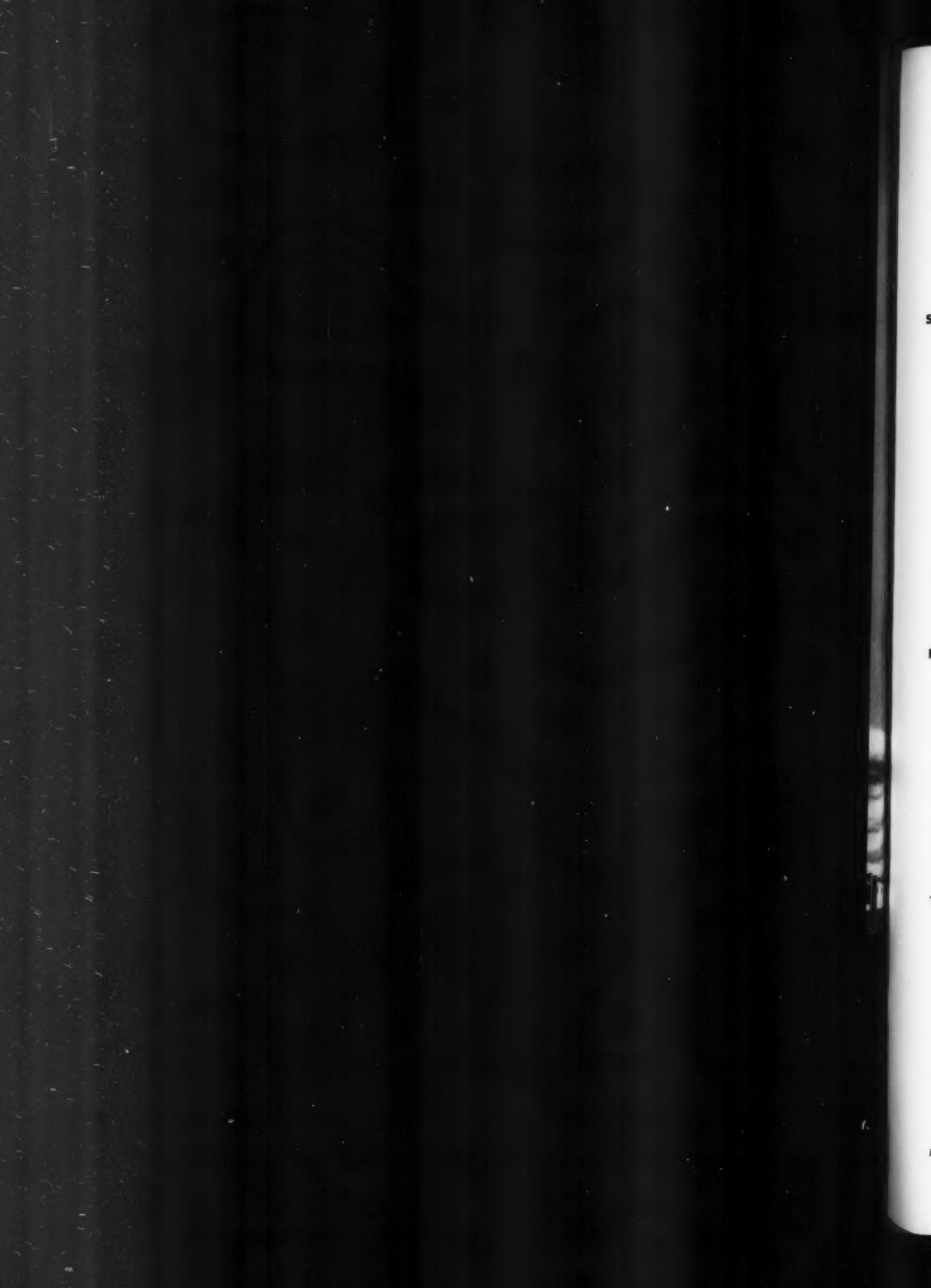


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American Perfumer

VOL. 76, NO. 3

March, 1961

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Contenido
Inhalt

- Social and Economic Aspects of the Soap Industry Roy W. Peet 31

Changes outside the soap industry have caused major changes within the industry. Also as chemical knowledge increases, product improvement results. Many interesting statistics are given.

Aspects économiques et sociaux de l'industrie du savon

Des changements au dehors de l'industrie ont apporté des changements importants dans l'industrie elle-même. Du fait des progrès constants réalisés en chimie, les produits mis sur le marché sont toujours améliorés. On y trouve de nombreuses et intéressantes statistiques.

Aspectos Sociales y Económicos de la Industria del Jabón

Los cambios ocurridos fuera de la industria del jabón han motivado cambios importantes dentro de la industria misma. Además, a medida que aumentan los conocimientos en química, las consecuencias son mejoras en los productos. Se dan aquí muchas estadísticas interesantes.

Soziale und wirtschaftliche Gesichtspunkte in der Seifenindustrie

Anderungen ausserhalb der Seifenindustrie haben einen wesentlichen Wechsel innerhalb der Industrie verursacht. Wenn sich die chemischen Kenntnisse erweitern, so werden auch die Erzeugnisse besser. Viele interessante Statistiken werden aufgeführt.

- Perfuming of Soaps and Related Products Roy Huttleston 36

Changing demands necessitates changes in production methods to keep a-pace. Synthetics are playing a greater role.

Procédés pour parfumer les savons et les produits apparentés

Pour répondre aux demandes sans cesse changeantes il est nécessaire de réviser constamment les méthodes de production. Les produits synthétiques jouent un rôle très important.

El Perfume de Jabones y Productos Asociados

La devolución en la demanda exige cambios en los métodos de producción, para mantenerse al ritmo de los tiempos. Los productos sintéticos desempeñan un rol más importante ahora.

Parfümierung von Seifen und ähnlichen Erzeugnissen

Wechselnder Bedarf bedingt Änderungen in den Produktionsmethoden, um Schritt zu halten. Synthetisches Material spielt eine immer grösitere Rolle.

- Triethanolamine Soap Emulsions Are Still Important Roy R. Failla 39

Triethanolamine soaps continue to be of first importance, despite many new products for soap formulation. This is due to their unusual combination of desirable properties for nearly all finished products.

Les émulsions de savon Triethanolamine sont encore très importantes.

Les savons Triethanolamines continuent à être de première importance malgré les nombreux nouveaux produits s'appliquant aux diverses formules pour savon. Ceci s'explique à cause de leurs propriétés fort désirables pour la plupart des produits finis.

Las Emulsiones de Jabón de Trietanolamina son Todavía Importantes

Los jabones de trietanolamina siguen siendo de importancia primordial, a despecho de los muchos productos nuevos creados para la formulación de jabones. Esto se debe a su combinación singular de propiedades ventajosas para casi cualquier producto acabado.



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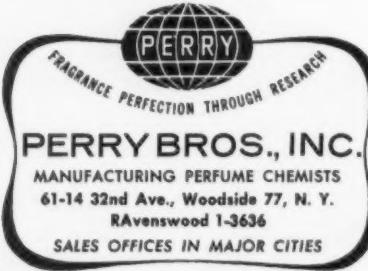
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Triethanolamin Seifen-Emulsionen sind immer noch wichtig

Triethanolamin Seifen stehen immer noch an erster Stelle trotz vieler neuer Erzeugnisse zur Seifen-Formulierung. Dies beruht auf der ungewöhnlichen Kombination der für fast alle Fertigerzeugnisse wünschenswerten Eigenschaften.

Composition of Modern Detergent Bars.....Donald Price 43

Problems of production and compounding these soaps are set forth, plus a round-up of what has already been accomplished on this scientific front.

Composition des barres de détergent modernes

Les problèmes se référant à la composition et à la production de ces savons y sont exposés. En plus, vous y trouverez un ensemble d'idées sur ce qui a déjà été accompli dans cette branche scientifique.

Composición de las Barras de Detergente Moderno

Se indican los problemas de producción y composición de estos jabones, así como un tratado general de lo que se ha logrado ya en este campo científico.

Zusammensetzung moderner Waschmittel in Stückform

Probleme in der Produktion und Zusammensetzung dieser Seifen werden erörtert, und eine Übersicht über alles, was bisher in wissenschaftlicher Hinsicht erreicht worden ist, wird gegeben.

Modern Trend in Deodorant Soaps

.....*M. M. Linfield and R. E. Casely 47*

Significant research activity has been underway in the area of the synthesis of novel anti-bacterial agents for use in toilet bars. The authors project the future in the light of the past.

Tendance moderne aux déodorants

Des recherches riches en signification sont en train de se faire dans ce nouveau domaine d'agents anti-bactériens dans l'emploi des savnettes. Les auteurs projettent l'avenir par rapport au passé.

Tendencia Moderna en Jabones Desodorantes

Se ha estado desarrollando una actividad investigadora significativa en el campo de la síntesis de agentes nuevos anti-bacterianos para usar en barras de jabones de tocador. Los autores proyectan el futuro con referencia al pasado.

Moderne Richtung bei Geruch verhügenden Seifen

Auf dem Gebiet der Synthese neuartiger, Bakterien bekämpfender Mittel zur Verwendung in Toiletten-Seifen geht eine bedeutende Forschungstätigkeit vor sich. Die Autoren geben ein Zukunftsbild im Licht der Vergangenheit.

Insoluble Metallic Soaps.....Phillip D. Reed, Jr. 49

The three classes of insoluble metallic soaps are discussed. Properties of the metallic stearates are covered plus formulation and use in various toilet goods preparations.

Savons métalliques insolubles

Les trois catégories de savons métalliques insolubles y sont discutées. On y parle des propriétés des stéarates métalliques ainsi que des formules et de l'emploi des différents produits de toilette.

Jabones Metálicos Insolubles

Se tratan aquí las tres clases de jabones metálicos insolubles. Se habla de las propiedades de los estearatos metálicos, así como su formulación y empleo en varias preparaciones de productos de tocador.

Unlösliche metallische Seifen

Die drei Gruppen unlöslicher, metallischer Seifen werden besprochen. Eigenschaften der metallischen Stearate werden behandelt, sowie deren Formeln und Verwendung in verschiedenen Toiletten-Mitteln.

Chemical Additives to Soaps.....Paul I. Smith 51

Author discusses various additives and gives detailed reasons for using them in soaps, plus the various quantities required in formulations.

Les additifs chimiques dans le savon

L'auteur discute des différents additifs et explique les raisons pour lesquelles ils sont employés dans le savon. Il parle également des quantités requises pour ces formules.

Aditivos Químicos en Jabones

El autor habla de varios aditivos y presenta razones detalladas para emplearlos en jabones, aparte de las diferentes cantidades necesarias para las formulaciones.

Chemische Seifen-Zusatzmittel

Der Autor bespricht verschiedene Zusatzmittel und führt in einzelnen die Gründe an, warum sie in Seifen verwendet werden, sowie die verschiedenen Mengen, die zur Formulierung notwendig sind.

Fatty Acids versus Natural Fats as Cosmetic Soap Base

H. A. Molteni 55

Author discusses the pros and cons of each type of raw material for soap-forming base in batch production of cosmetics. Procedures and proper handling techniques are covered.

Acides gras à la place de graisses naturelles comme cosmétiques de base pour savons

L'auteur discute des avantages et des désavantages offerts par chaque type de matière première servant de base pour la fabrication de savon dans la production en gros des cosmétiques. Techniques et procédés y sont soumis.

Acidos Grasos vs. Grass Naturales como Bases para Jabones Cosméticos

El autor argumenta sobre los factores en pro y en contra de cada tipo de materia prima para base formadora de jabón, en la producción en lotes de cosméticos. Se tratan aquí los procedimientos y las técnicas correctas de manipulación.

Fettsäuren im Gegensatz zu natürlichen Fetten als kosmetische Seifenbasis

Der Verfasser bespricht das Für und Wider jeder Art Rohmaterial für eine seifenbildende Basis bei Mengenherstellung kosmetischer Mittel. Die Methoden und die richtige technische Handhabung werden behandelt.

Syndets versus Soap for Dry Cleaning

A. Davidsohn 59

Formulae for various types of dry-cleaning detergents and soap are presented, plus a discussion on preparation of syndets. Author also covers spotting agents and the role of soap in them.

Syndets à la place de savon pour le Nettoyage à Sec

Formules pour différents types de détergents pour nettoyage à sec et pour savons y sont présentées. On y discute également la préparation de ces syndets. L'auteur parle aussi des détachants et le rôle que le savon y joue.

Detergentes Sintéticos vs. el Jabón para la Limpieza a Seco

Se presentan aquí fórmulas para diferentes tipos de detergentes y jabones para la limpieza a seco, así como también se habla sobre la preparación de detergentes sintéticos. El autor abarca también el tema de substancias manchadoras y el papel que desempeña el jabón en ellas.

Synthetische Mittel ("Syndets") im Gegensatz zu Seife bei chemischer Reinigung

Formeln für verschiedene Arten synthetischer Mittel und Seife zur chemischen Reinigung werden aufgeführt, und die Herstellung synthetischer Mittel ("Syndets") wird besprochen. Der Verfasser behandelt auch Mittel zur Fleckentfernung und die Rolle, die Seife dabei spielt.

Is There a Place for Soap in Shampoos?

John R. Gilman, Jr. 62

The trend continues for shampoos to be more than cleansing preparations for the hair. The formulation must also have a cosmetic advantage. Too, various hair preparations must be tolerated by the shampoo.

Y a-t-il une place pour les savons dans les Schampooings?

De plus en plus on ne se contente pas d'employer les schampooings pour laver simplement les cheveux. Le formule doit aussi contenir un avantage cosmétique. Et aussi, un grand nombre de préparations pour cheveux doivent être tolérées par le schampooing.

Hay Lugar para el Jabón en los Champús?

Continúa la tendencia favorable a champús en forma de preparaciones algo más que simplemente limpiadoras para el cabello. La formulación debe tener también una ventaja cosmética. Además, el champú debe tolerar a varios preparados para el cabello.

Spielt Seife eine Rolle bei Schampun?

Shampun ist auch weiterhin nicht nur ein Haar-Reinigungsmittel. Das Präparat soll auch in kosmetischer Hinsicht Vorteile bieten. Auch muss das Schampun verschiedene Haarmittel vertragen.

Toiletries Industry Growth . . . up over 50% in Four Years . . . page 67

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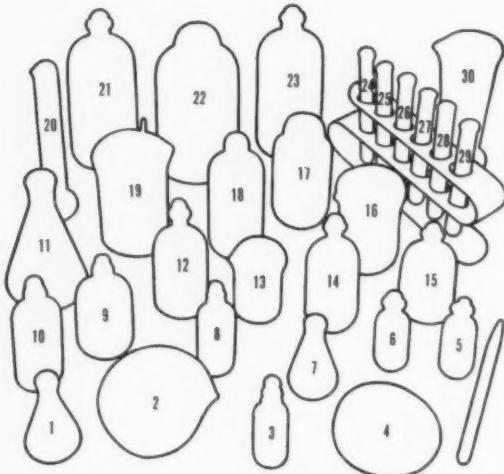
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Q. We have a foam hair wash lotion containing the following ingredients: (formula given). We are interested in including a chemical in the formula which would serve as a dandruff solvent and remover. We have heard that selenium disulfide is used for this purpose. Could you please advise how this chemical is incorporated and the amount generally used in a hair lotion? Perhaps you could also recommend another chemical better suited to remove dandruff? B. U., Rhode Island

A. Please be advised that the use of selenium disulfide in this type of scalp preparation is patented and therefore you are unable to use it. There are very few materials which are true solvents for dandruff. Many will kill some bacteria associated with dandruff and these consist of a group of germicides, the best known of which is hexachlorophene. Other substances loosen the scales of dandruff and by brushing or washing will disappear. Still other substances have a different action and these are generally sulfur compounds of which colloidal sulfur is the best example. You can get colloidal sulfur from your local wholesale druggist.

Q. For many years we have been an enthusiastic subscriber of your magazine and follow with interest all your instructive publications. Our company at present specializes in the production, import and marketing of cosmetics. Our products such as hair dyes, home permanents, sun tan lotions, hair tonics, and shampoos are best sellers. Having the intention to produce a new liquid shampoo on a triethanolamine lauryl sulfate base, we would be happy to have your recommendations for products to add to this liquid in order to provide the softness, thickness and fattening of this shampoo. C. M. T., Iran

A. The best modifiers for a shampoo built on triethanolamine lauryl sulfate are alkylolamides of lauric-stearic acid. In addition, you may want to add some water soluble lanolin which, as you know, is lanolin that has been treated with varying amounts of ethylene oxide to make it water soluble. Glycol laurates have also been used for enhancing hair gloss. The alkylolamide gives you the thickness and some of the superfatting which you require.

Q. Recently several bleaching creams using hydroquinone as the active ingredient have been put on the market. Please advise if you have any information regarding the amount of hydroquinone to be used in a product of this type. We would also be interested in any literature references you can give us. V. R., La.

A. We do not recommend the use of hydroquinone or its derivatives for the purpose of bleaching skin. We are not aware that hydroquinone itself is being used for this purpose, but we do know that there have been a number of papers published in dermatological journals on the use of butyl hydroquinone. Indeed, the discovery that this material would bleach skin was accidental. It is an antioxidant used in the compounding of rubber. Negroes handling the mixture eventually found themselves developing white spots on their hands and arms. The difficulty with compounds of this type is that the bleaching is not uniform; the ingredient can be absorbed, may have a systemic action, and if so, may remove color from all mechanisms of the body which could produce color in the same manner as color is produced in the skin. We cannot make any literature searches for you, but we suggest that you look into *Chemical Abstracts* and the quarterly *Index Medicus*.

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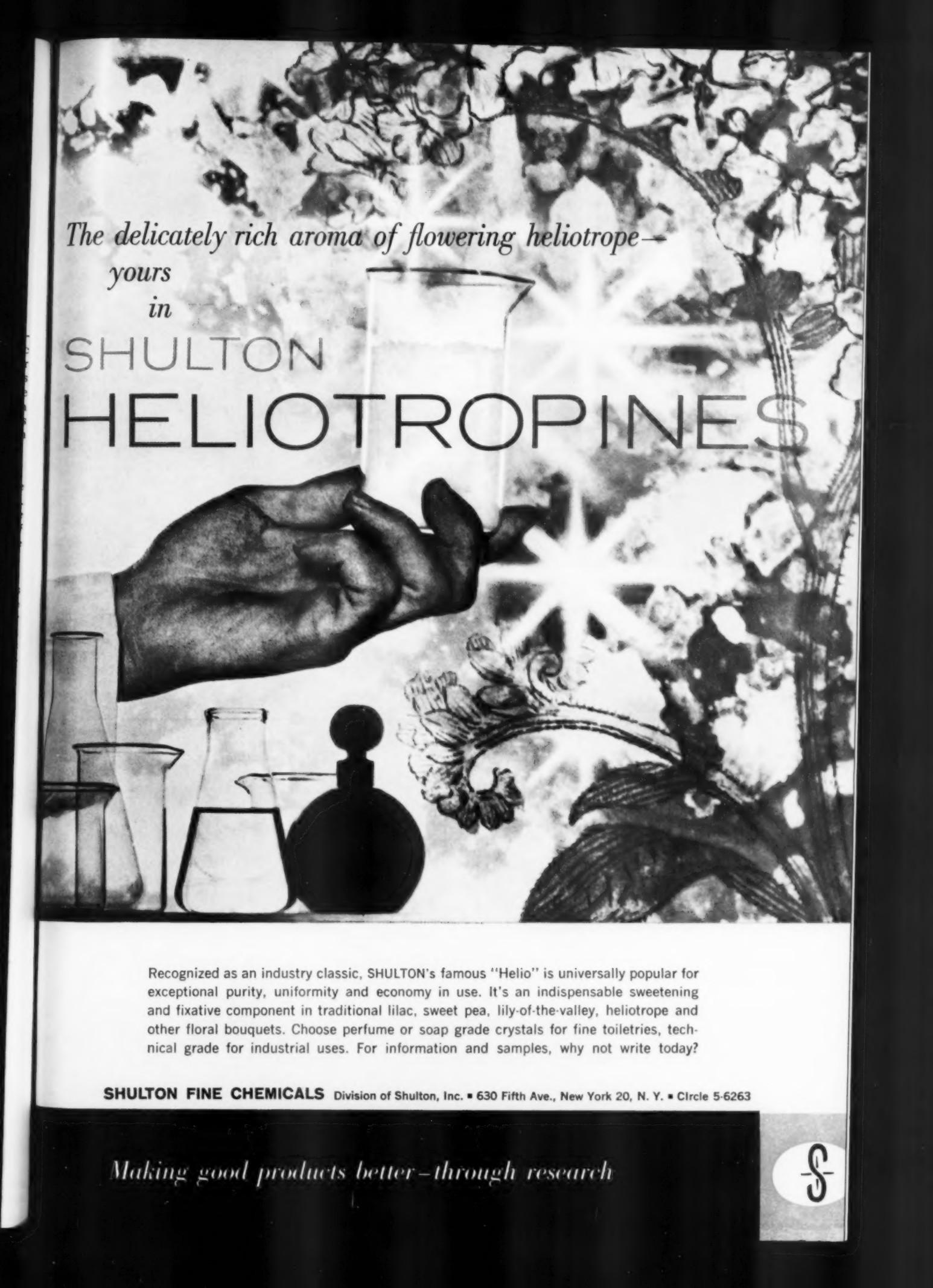
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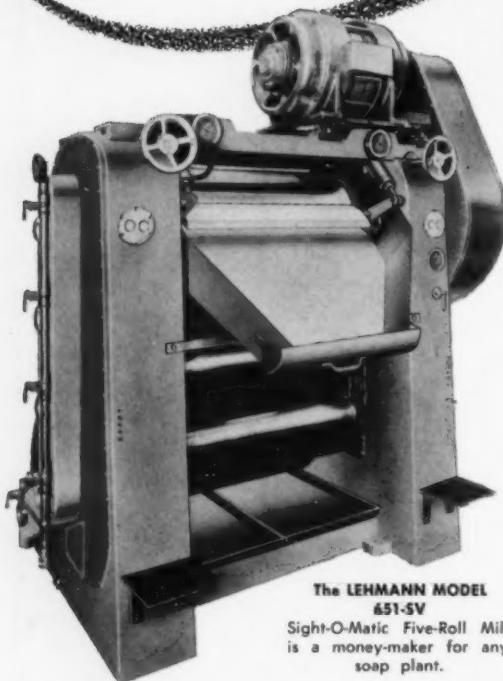
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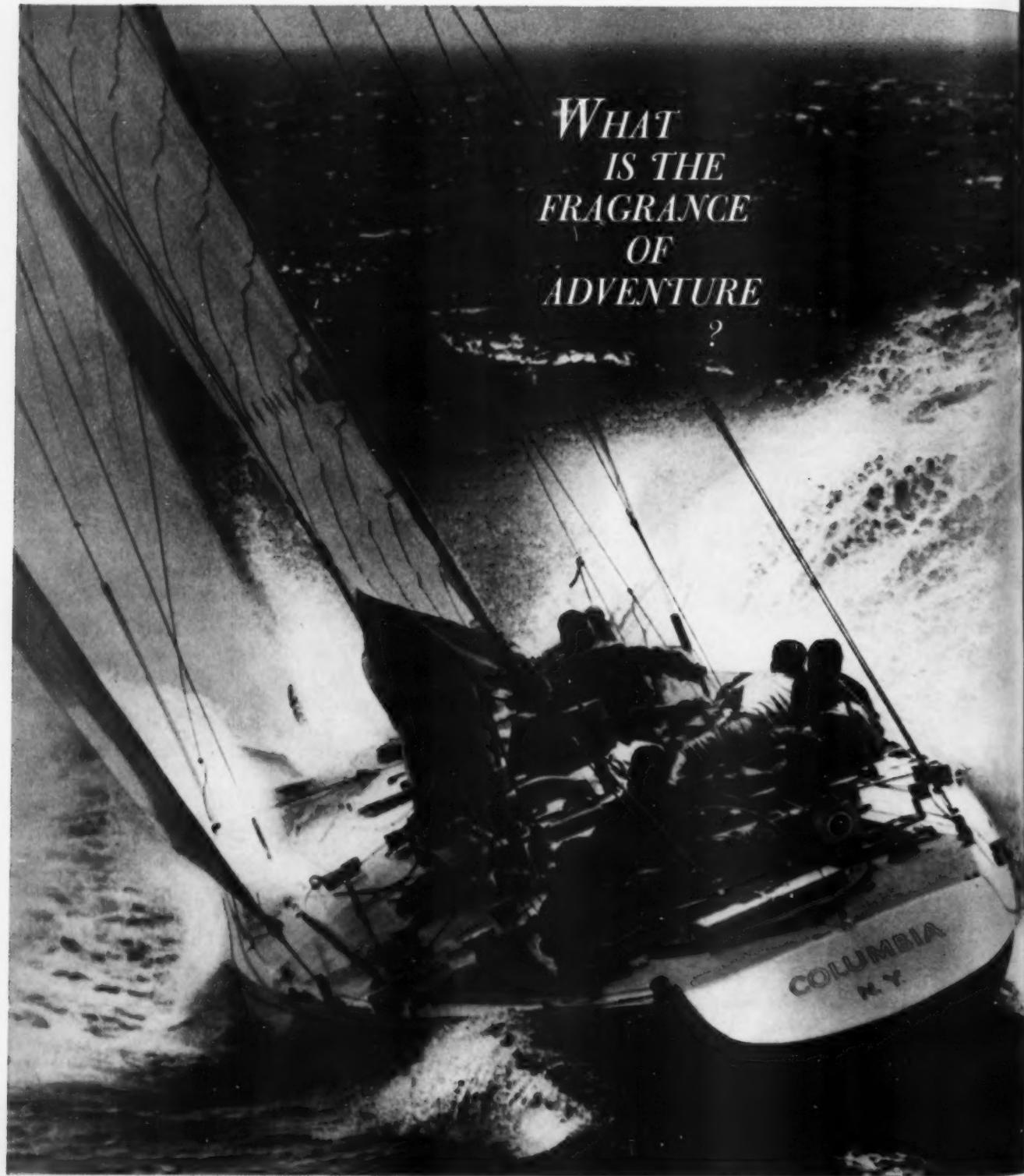
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Notes

At 47 years of age a man is pretty young to join his Maker, but Irving Colbert did. His passing leaves a void that will be difficult to fill Dave Tillotson has decided to be a consultant. Good luck, old boy. I know what it is like. Hope clients are many and profitably appreciative.

Inspecting some private label companies in Latin America, was surprised that the aerosol equipment was German; lots of other equipment was both German and Japanese.

Armando Breton, Executive Secretary of the Mexican counterpart of the T.G.A. is an avid student of the ancient Maya and Inca Was able to christen with bubbly champagne, Bill Trevino's new home, too. . . . Ingenieur Illescas (Salubridad) has his own "private" pyramid which I hope to see next time I am in Mexico. Chipp's, Delmonico's, Villa Fontana, El Folcolare, Quid, Bavaria and Muralto (on top of the city's tallest building) are all good spots in Mexico City—maybe a bit expensive Panama City's free port isn't so free. Keflavik, Iceland has better deals. . . . From here I go to Western Canada—what a change!

Koulourides and co-workers find that tooth enamel in humans can be rehardened by solutions of calcium phosphates (Ca/P ratio of 1.67) *Nature*, 189, p. 226 (1961) . . . All

the best to Tom Farrell, long time co-owner and editor of our worthy contemporary, *Drug and Cosmetic Industry*, in his retirement. But why retire to Ireland? The aging Irishman who has the money, goes elsewhere. Tom must have a reason.

Have seen some of the water soluble pearls containing lemon oil produced by National Cash Register Company, research department. They may have quite an idea here. The pearls can come as fine as powder Kligman now confirms that hair loss can come from anxiety (Feb. Arch. Dermatol.)—but it can grow back This department must agree with Steve Mayham and Jake Reck in their blast at F.D.A. because of a proposed regulation which would deny exemption to rinses, tints and color shampoos by excluding them from the definition of "Hair Dyes".

Soon to appear in the AMERICAN PERFUMER will be a digest of Chiu's article in the Feb. 11 A.M.A. Journal refuting the rejuvenating effect of Anna Aslan's procaine treatment. Read it Same issue of the A.M.A. Journal carried an interesting article showing that heart attacks occur more often among lower salaried men, and least in the high salary group. The report was based on a du Pont study of over 75,000 men in the company population

Aerosol hair spray patent

The U. S. District Court upheld

the validity of U. S. Patent 2,871,161, the controversial La Maur PVP Hair Spray patent. However, one finds Judge Devitt's decision hard to understand; particularly that portion which states that the patent covers copolymers; for if it wouldn't, an inventor would be restricted so narrowly as to invite imitation due to the indefiniteness of his patent, says Judge Devitt. This is a new twist. But the appeal may clarify this issue.

Right on the heels of this litigation came a price increase on one of the more useful materials that doesn't interfere with the La Maur patent.

The supplier explains it this way. They are not "on stream" yet with a full scale plant. The demand for pilot plant lots has increased greatly since the patent decision. The supplier has been selling pilot plant material at prices of full scale operation. They are no longer able to do so. Hence, the price goes up to the proper "pilot plant" size production. Meanwhile, a lot of people are waiting full scale operation.

F.D.A. seizures for February

It's a polyglot assortment of seizures. Atlantic Ocean water selling for \$3.75 per gallon—claimed to be a "Chemical Smorgasbord". Good for Arthritis all the way to Parkinson's disease. Rotten eggs in Tennessee, Bennie peddlers in Alabama, Vitamins and three cosmetics. A

miracle cream able to "look below the surface". A suntanning lotion that heals burns, corrects acne, and positively prevents sunburn. A skin lotion that had a circular stating, "Now you can get what Yoga gives . . . without standing on your head."

Liquid eye liner

A supplier of a trade named grade of magnesium aluminum silicate offers a basic formula for experimenters on which to base a liquid eye liner. It consists of:

magnesium aluminum silicate	2.5 to 3.5%
water	up to 75%
PVP	2.0%
water	10%
pigment	10%
preservative qs.	

Add the silicate to the water under agitation until smooth. Dissolve the PVP in water, with the aid of heat. Add the PVP solution to the silicate dispersion, followed by the pigments. Milling or homogenizing may be necessary to obtain a smooth product. The preservative should be dissolved in the water used for dispersing the silicate.

Eye preparations are often not perfumed. If they are, great care should be exercised to use low concentrations of non-sensitizing fragrance.

Introduction à l'Etude des Parfumes by T. Bassiri. 278 pages, illustrated and indexed. In the U.S.A., Stechert-Hafner, Inc., New York 3, New York, 1960, Price \$8.50.

This is a beginner's book on perfumes, and the art of perfumery. The text is divided into 5 chapters starting with a discussion of the vocation or profession, odor, perfumes, a discussion of well known perfumery oils and finally a review of the main synthetic chemical aromatics used in Perfumery.

Throughout, one sees the hand of an experienced perfumer preparing the text. Helpful to the neophyte is the classification of odors by perfumers of recent times such as Cerbelaud and Billot. Useful, too, is a long list of terms used in perfumery which one often sees used in describing an odor or an odorous material.

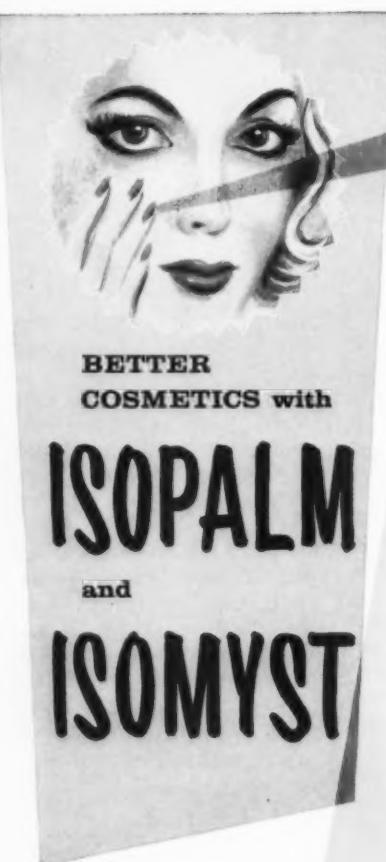
A considerable amount of space

is devoted to chemistry and the role it plays in fragrance development. Skin safety, incompatibilities, are mentioned and stressed. A basic set of aromatic substances frequently used by perfumers enables the budding perfumer to get started sensibly. The formulas then suggested are simple classics of modern formulation.

On page 142 the author presents

a review of the properties of well known essential oils, running through page 175. The chapter on synthetic aromatics contains almost 90 pages of interesting facts.

This is not a book of formulas. It is an introduction to perfumery, masterfully presented as a text almost, one can say, in academic style. All novices and old timers will find the book inspiring and helpful. (M. G. deN.)



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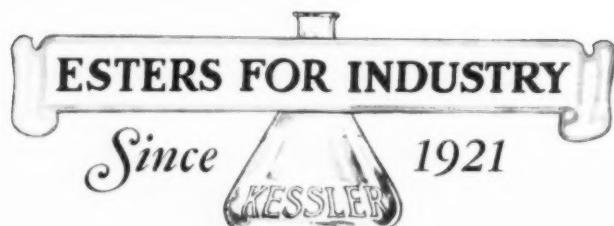
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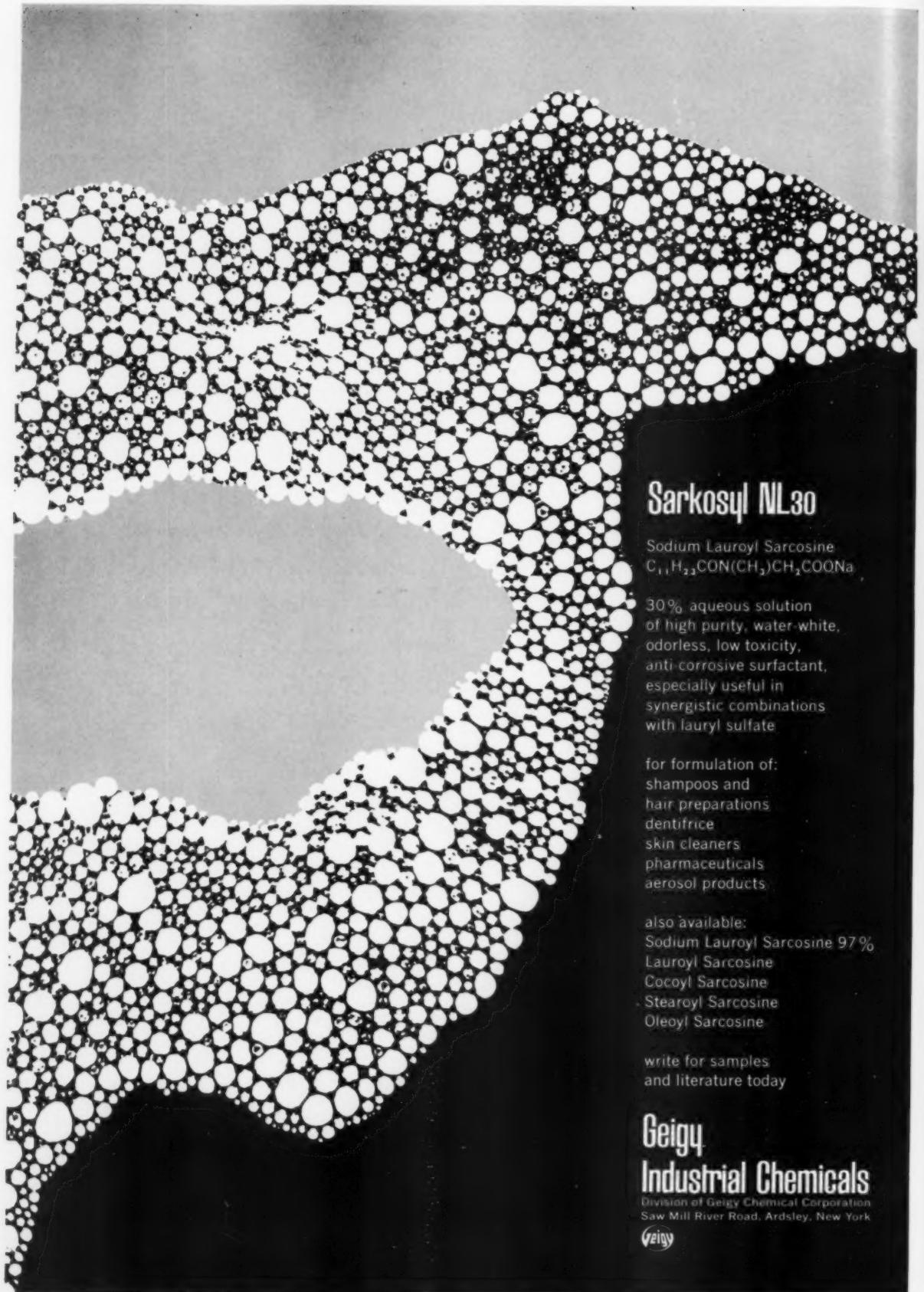
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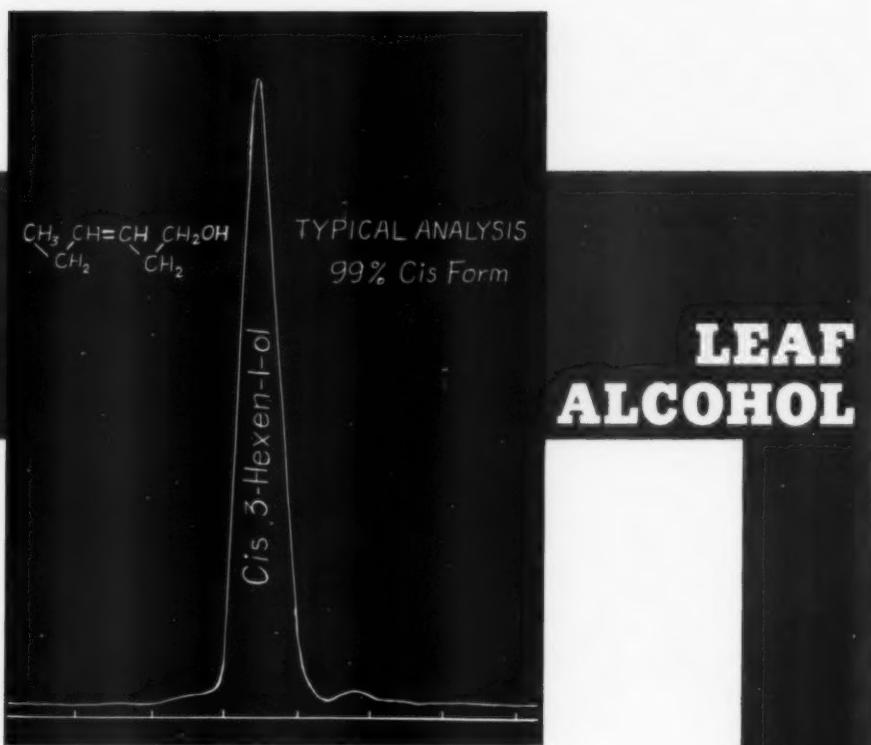
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What are the social-economic aspects of the soap industry?

by Roy W. PEET, Manager,
Association of American Soap &
Glycerine Producers, Inc., New York City

Roy William Peet has been engaged in soap manufacturing business since 1918. Currently, manager of the Association of American Soap & Glycerine Producers, Inc., New York City, Peet was in the sales department of Colgate-Palmolive-Peet Co. from 1922-26.

He was director of advertising 1937-40; assistant to president 1940-44; and vice president of the firm until 1948 when he joined the soap and glycerine group. During World War II he was chairman of the American Fat Salvage Committee.



SOAP IS SUCH A FAMILIAR product of day to day use that it is easy to overlook or forget that it is highly important and has an intensely interesting and dynamic history. There is no authentic record of the origin or first use of soap, and the several theories, including the discovery of the washing properties of the combination of wood ashes and fat from sacrificial animals, are so well known that there is no need to repeat them.

From the early days after the birth of Christ and up to the fall of Rome, cleanliness and culture had a happy alliance. Rome carried the sound principles of dependable water supply and of adequate sanitation throughout the great area under its control. It is only necessary to consider the recurrent periods of disease and plague which occurred after the fall of Rome to realize that soap and cleanliness were life savers in the Roman Empire. Jumping with seven-league boots, cleanliness began again to have public recognition for merit after the Crusades and it has grown as a "way of life" almost constantly ever since.

Curiously, soap, which already had proven its public health value, became subject to a government-granted monopoly early in the 17th century in England, and in 1711 an excise tax was imposed on the

manufacture of soap. Like all taxes, this increased—from one penny per pound to threepence per pound in 1816. The tax was abolished in 1852.

When the present Food, Drug and Cosmetic Act was passed in the United States in 1937, a cosmetic was defined to exclude soap. Senator Copeland of New York, the author of the Act, and himself a practicing physician, said during consideration of the Bill:

"The Senator from New York (Senator Copeland himself) would be the last man on earth to interfere with the free use of soap and water. I think if the American people would indulge frequently in the use of soap and water they would escape most of the diseases which are conveyed by germs . . . the ordinary household soaps and household cleansers are clearly beyond the purposes of the Bill and ought to be definitely excluded."

Soap making becomes an industry

Soap in this country at first was largely a home made product. With the advent of power—first water, then steam, then electricity—soap-making moved from the home to the factory.

Soap is a cleansing adjunct. The soap manufacturer must study the problems of easier removal of dirt to find new opportunities to serve. This is true regardless of the market he serves or wants to serve—household or non-household, fabric or plastic, skin or hair. In this constant search for new opportunities to serve, the soap industry has learned to specialize in research—both technical and market.

Changes outside the soap industry have caused major changes within the industry. Four such changes are worthy of particular note:

1. Mechanization of the washing function
2. Increased knowledge of chemistry
3. The increase in availability and use of washable materials
4. Changes in the distribution of grocery products.

Mechanization requires new soap products

The hand washing of clothes used to be one of the most laborious chores in the home. One or two days a week were devoted to laundering. Soiled clothes were accumulated for the week. On Monday, or some other regular day, the accumulation was separated into various piles. Water in a "boiler" was heated, and an elaborate ritual of boiling, scrubbing, wringing, drying, and ironing was carried out. A bar of soap was rubbed on the clothes and the clothes were scrubbed on a corrugated board. If at all possible, a wash woman was employed to save the housewife from this drudgery.

The gradual development of the washing machine, which in part required the concurrent availability of running hot water in the house and the widespread availability of electricity, opened a vast new market for the soap manufacturer. Instead of a bar of soap, the housewife now needed a soap which would dissolve quickly and completely. Any undissolved particle of soap left on the clothes would leave an ugly brown spot after ironing. The need for solu-

bility led first to the development and rapidly increasing sale of soap chips and later of spray dried granulated soaps. Both of these products were packaged in paperboard cartons for convenient handling. A look at the statistics on home ownership of washing machines and on the sale of packaged soap products—chips, flakes, and granules—reveals these trends dramatically.

Year	Sale of Chips, Flakes, Powdered and Granu- lated Soaps—in Mil- lions of Pounds—not including synthetic detergents	
	Home Ownership of Washing Machines	
1921	1,535,000	524
1931	7,185,000	1,002
1941	15,600,000	1,838

More recently, the development and sale of electric automatic dishwashing machines is further reducing the drudgery of housework with a new and different demand and opportunity for the soap industry. Home ownership of electric dishwashers has risen regularly as follows:

Year	Number of Homes with Electric Dishwashers	
1952	1,050,000	
1956	1,838,000	
1959	2,885,000	
1960 (10 mos.)	3,200,000	

The mechanization of home laundering and the growing mechanization of home dishwashing have opened new demands and new opportunities for the soap industry. The development of some clothes washing machines required a soap or washing aid which did not foam or make a suds as freely as the regular soap product. The automatic electric dishwasher required a soap or detergent which did not produce an excess of foam and would not spot, stain, or leave a cloudy film on dishes or glassware.

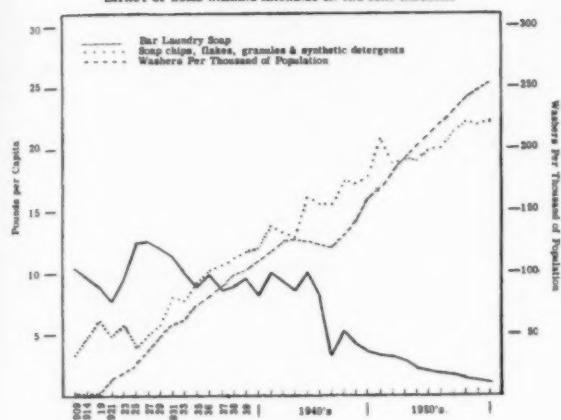
Chart 1. shows the ownership of home clothes washing machines per 1000 population and the sale of bar laundry soaps and of the newer more quickly soluble products, per capita. The latter includes not only chips, flakes, and granulated soaps but synthetic detergents, both liquid and non-liquid.

Increased knowledge of chemistry stimulates product improvement

The soap industry was, until fairly recently, a craft industry. The art and secrets of soap-making were jealously guarded and handed down from father to son, from master to apprentice. The discovery of the nature and relationship of fats, glycerine, and fatty acids in the 19th century started the requirement for, and the constantly increasing importance of, the chemical laboratory to soap manufacture. Its influence spread from a center for process control to

CHART I

IMPACT OF HOME WASHING MACHINES ON THE SOAP INDUSTRY



the inspection of raw materials and the search for new products—for new ways to serve in providing quicker, easier cleaning.

The discovery in Germany about 1930 of new chemical processes which would make a product similar to soap in its ability to foam and to cleanse was the first really new development in the chemistry of soap, and yet this new "synthetic detergent" gained acceptance very slowly until after World War II. In the United States the new product was useful to the Armed Forces in the formulation of soaps which would work in cold water and in salt water. Production facilities were limited and the volume was small. The shortage of fats due to the loss of the Philippines gave additional and favorable stimulus to synthetic detergent development. World War II laid the real groundwork for the rapid expansion of synthetic detergents in the post-war period.

Synthetic detergents changed

Originally, these new products seemed, by nature, to be limited to dishwashing and "light duty" laundering. The later addition of phosphates in their formulation made possible products which were satisfactory for the "heavy duty" requirements of washing machines and general purpose household cleaning.

Of the total volume of soaps and detergents in 1959, synthetic detergents accounted for 74%. When it is realized that these products accounted for less than 4% at the end of World War II in 1945, the revolutionary growth is apparent. This rapid growth changed the economic and competitive position of many companies within the industry. The older soaps, while excellent cleansers, had one fault—they combined with the mineral salts in water to form insoluble metallic soaps. No foam was made and no detergency was available until these metallic salts (the hardness of the water) were overcome. The new synthetic detergents did not form the insoluble compounds, hence they were able to make a suds and to possess detergent power immediately. As this advantage became apparent, the housewives of the country turned to the newer products. Later developments in chemical knowledge led to the addition

of whitening or brightening agents and of soil-dispersing materials which gave a whiter, cleaner wash. The new products were at least as readily soluble as the older soaps.

At first the price per pound was higher, but the advantages were sufficient to overlook the small price differential. Today, the price differential has disappeared and the usual household packaged synthetic detergent costs no more per pound than granulated soaps.

Synthetic detergents in toilet soap

Of the total tonnage of soaps and detergents, toilet soaps in 1959 accounted for approximately 13-14%. The impact of synthetic detergents on the toilet soap market has not been so great as in the products sold for non-personal use. Interestingly, many of the newer toilet bar products are combinations of soaps and synthetic detergents so that there is today no clear distinction between the two. The Soap Association statistics on toilet soaps do not differentiate between soap and synthetic detergents or combinations of both. Toilet soap lends itself to the aesthetic qualities of color and perfume. In addition to these additives, germicides or bacteriostats are available for incorporation in toilet bar products. Thus, depending on raw materials and additives used, a wide range of products can be and are being produced. Different personal tastes, different types of skin, and different water qualities make this variation in toilet bars desirable.

Growth of liquid synthetic detergents

A more recent and interesting trend is the growth of liquid synthetic detergents. In 1959 these accounted for about 17% of the total tonnage of synthetic detergents. But this is an increase from only 5% five years earlier. Of course, these products are completely and immediately soluble, and like non-liquid synthetic detergents have the advantage of not making insoluble compounds in hard water—not leaving a ring around the dishpan.

Most of the detergents sold for household or industrial use are anionic compounds. Non-ionic and cationic detergents are relatively small in volume but have important and highly specialized uses. Of the total tonnage of soaps and detergents it is estimated that household uses account for 80-85%, the balance going to industrial or non-household uses.

Although there has been a great change of raw materials, from fats and oils to petroleum fractions, the chemist of today has an opportunity to use other materials such as tall oil and specific fatty acids. A soap or detergent product can be tailor-made from readily available materials for individual cleaning needs to a far greater extent and with more exactness than was ever possible before.

The variety of raw materials, additives, water qualities and other factors involved in soap or detergent manufacture make elaborate testing in the laboratory essential. Products intended for use in washing clothes are carefully tested with standard soils and with actual clothes. A real laundry patterned after the home laundry is routine and the procurement of a steady

supply of soiled clothes is common practice. If the product is for personal use as a toilet soap or if it is to come in contact with the skin, the effect on the skin of many people is studied. Tests for toxicity, foaming, detergency and personal preferences are elaborate and regular. All of this work is carried on to determine the qualities of a final finished product. And this is not the end. The product must go through elaborate sales tests to see that it performs in the field as expected from the laboratory tests before it is finally considered ready for real marketing efforts. Work continues constantly behind the closed doors of the chemical laboratories of the soap and detergent manufacturers and elsewhere to find new and better products to assist in the cleansing process in every field.

Increasing production and use of washable materials boosts soap use

Chemistry has likewise played a great part in the discovery of new materials which lend themselves to the production of new synthetic fibres and textiles, and in the manufacture and application of plastics and protective coatings. Nearly everywhere in our daily lives, these new products are playing an increasing importance and, in turn, increase the use of soaps and detergents. In the upholstery and finish in our automobiles, in window shades, curtains, draperies, in upholstery in furniture, in floor coverings, in wall and floor finishes, our surroundings are increasingly washable. No longer is the home laundry confined to bed linens, towels and cotton clothing. In both men's and women's apparel, not to mention that of babies and children, washability has gained importance as a key factor in consumer choice.

Changes in soap distribution increase importance of packaging and advertising

In the early part of the 20th century, household soaps were sold in bulk quantities to the wholesale grocer who, in turn, sold and delivered to retail grocery stores the toilet and bar soaps of that day. The soap manufacturer, for competitive reasons, began calling on the retail trade, soliciting orders which he, in turn, gave to the wholesale grocer for shipment or delivery. Over a period of time, this proved to be a costly method of distribution. It placed a sizable inventory of finished product between the soap manufacturer and the retail store.

An old established industry practice of guaranteeing the stocks of soaps in the hands of the wholesale trade against a decline in price gave a powerful inducement for the wholesale grocer to increase his inventories in a period of rising prices. This stockpiling inflated the manufacturer's sale during these periods, although it did not reflect actual consumer demand. When soap prices declined, the trade quit buying and the manufacturer's volume was sharply reduced. In addition to this unhappy circumstance, the manufacturer was forced to make good on his guarantee against decline on the large inventories previously purchased by the wholesaler. It is understandable that in these periods the demand for red ink increased.

Tallow as the basic raw material for soap manu-

facture was the key factor in the rise and fall of soap prices. The increased production and use of synthetic detergents has changed this picture drastically. Petroleum based alkylates at stable prices have replaced tallow as the principal raw material for the industry. With a stable raw material base, the price of the finished product has not fluctuated, and there is no longer the incentive for large stock in wholesale inventories. Soap industry profits have become more stable.

To reduce selling costs and increase selling efficiency, the soap manufacturer began selling direct to the retail trade after World War I. This was a sharp change in the method of distribution. With some hesitation the step was taken by some manufacturers, first by geographic sections. This change likewise reduced the over-hang of large inventories in the hands of wholesalers and was instrumental in maintaining more balanced production schedules from year to year. This, in turn, helped materially in maintaining a steady labor force—better trained and higher paid.

The change in the retail store has been as dramatic as elsewhere in the economy. Purchases by the housewife of bulk containers of crackers, sugar, flour, and cereals have changed to the purchase of packaged products carrying brand names. This has reduced the reliance on the retail grocer for independent judgment and recommendation. Retailing has become a matter of making products readily available on retail shelves in plain sight. Prices have been placed on the product or on the shelf where the product is stored. Competition among retailers for store traffic has increased. Parking problems in the cities have led to development of large suburban shopping centers and super-markets.

Competition and product promotion benefit consumer

These changing trends in product distribution have brought about new competition in the soap industry in terms of packaging and of advertising. It is now strictly a problem of the soap manufacturer to see that his product moves from the retail shelves into the hands of the housewife. Experience has proven the efficiency of advertising, combined with other elements, in the successful marketing of soaps and detergents. The other elements are:

1. Product quality in terms of service rendered
2. Competitive price, quality considered
3. Effective distribution—making the product available at the consumer level.

In this listing, packaging and promotion, important as they are, are included as a part of the advertising program. If any one of the three elements is weak, the whole marketing program is weak, regardless of the advertising. Numerous case histories point to marketing failures despite huge advertising expenditures. Advertising must, in a successful marketing program, be preceded by sound technical work in the laboratory, and in the various steps of marketing research, including careful pre-testing.

The total production of soaps and synthetic detergents has represented a steady growth with some variation caused by war. This growth is related more to population than to national income. Total sales in pounds and pounds per capita is as follows:

	Total Pounds 000 omitted	Pounds per Capita
1921	2,450,000 lbs.	22.6
1931	2,892,000 lbs.	23.3
1941	3,846,000 lbs.	28.8 (War)
1951	4,006,000 lbs.	25.9
1959	4,821,000 lbs.	27.2

The figures for the full year 1960 are not yet available but for nine months there was a 3% increase over the previous year. Applying this increase to per capita figures for 1959 per capita for 1960 is estimated at 28.0 lbs.

Baron Justus von Liebig, an eminent German chemist of the early 19th century said, "The quantity of soap consumed by a nation would be no inaccurate measure whereby to estimate its health and civilization." The United States stands in the top group of the countries of the world in terms of per capita consumption of soaps and detergents.

Chart 2. shows the tremendous changes in kinds of soap or detergents produced.

New source helps expand glycerine

Up to 100 years ago glycerine was discarded with the spent lyes from soap manufacture. Scheele, a Swedish chemist, first discovered glycerine in 1779. Later, Chevreul studied the nature and properties of glycerine and gave it its name about 1810-1820. In 1870 the first patent for the recovery of glycerine from spent lyes was issued in the United States. Nobel, on the strength of his discovering a method of producing nitroglycerine in a form that could be handled and the awful consequences of its use in war, established the Nobel Peace Prize at his death in 1896. It thereafter became a by-product of soap manufacture and an important source of revenue.

The neutral or whole oil or fat used to make soap is made up of fatty acids and glycerol. The fatty acid combines with the alkali to form soap and the glycerine drops out and is recovered through evaporation as crude glycerine which may then be refined. The practice of the industry has been to credit soap with the income from glycerine except for the cost of evaporation and refining.

As synthetic detergents replaced soap, less tallow or other fats or oils were used in soap-making. Consequently, less glycerine was recovered. Glycerine has many uses. It is important in the manufacture of cellophane, tobacco products, alkyd resins, explosives, pharmaceuticals, cosmetics, and many other products. Because of the reduced supply of glycerine some companies in the chemical business saw an opportunity for the profitable manufacture and sale of synthetic glycerine made from propylene. As a result, the production and use of glycerine from all sources is now greater than ever before.

Total production every fifth year indicates the trend as follows:

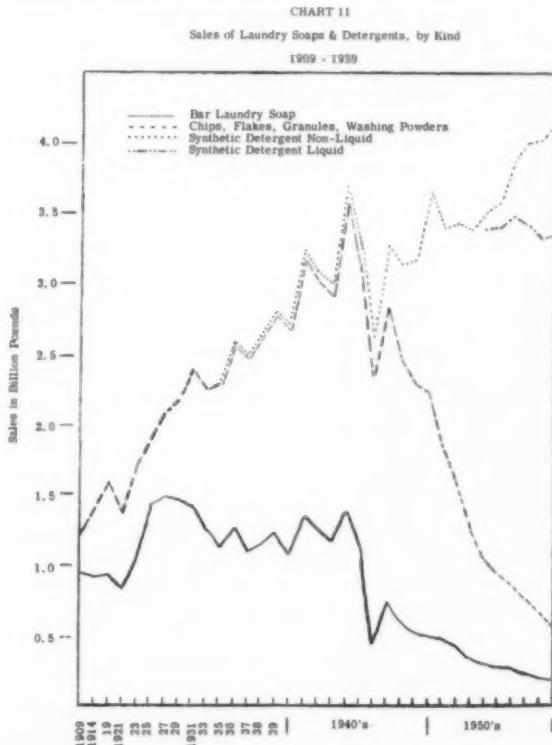
1940	157,856,000
1945	172,450,000
1950	225,512,000
1955	227,999,000
1960	270,000,000 (estimated)

Fatty acid developments

Since 1950, the production of commercial fatty acids from tallow, vegetable oil and their soapstocks has ranged from 365 to about 400 million pounds. Added to that, in the last several years, have been increasing amounts of tall oil fatty acids, estimated at 175 million pounds for 1960.

During this period, there have been many other significant changes in the types of fatty acids which have emerged—primarily as a result of improved separation, fractionation and hydrogenation processes. More and more mixed fatty acid has been hydrogenated to produce grades of stearic acid not available by straight separation of stearic and oleic. Also, more fractionated acids of specific chain length impurities of 90% or more have been produced. For example, fractions of coconut acids (lauric, myristic, etc.) now exceed in volume the straight coconut type mixed acids having risen from less than 10 to over 25 million pounds in the ten year period. Similarly, highly unsaturated fractions from soy and cottonseed sources have made progress as specialties, despite a decrease in the straight commodity-type vegetable fatty acids, due to tall oil fatty acid competition.

Today, the fatty acid producer is far more concerned about the expanding derivatives market. This includes nitrogen derivatives (amines, etc.), cleavage products (azeleic and pelargonic acids) and dimerized or polymerized acids, as well as esters and salts. In fact, the industry has made a rather complete transition from a commodity "upgrading" operation to a multi-product industrial chemicals business with emphasis on specialties which are the products of chemical research.





Roy Huttleston has been associated with the toilet goods industry since 1919 and has specialized in soap and its perfuming. He is a member of the perfume staff of Givaudan-Delawanna, Inc., Delawanna, N. J., and is shown working in the soap laboratory with an associate.

Perfuming of soaps plus related products

by ROY HUTTLESTON
Member of the Perfume Staff
Givaudan-Delawanna, Inc.

THE USE OF SOAP OR similar cleansing materials dates back many centuries, and if we were to trace the evolution of this very important commodity to its present status, it would certainly be an interesting treatise. The tremendous growth of the soap industry in the last century is evidence enough of the importance of soap as a commodity. The consumption of toilet soap today is extremely high, with early reports indicating that the 1960 sales were well over 250 million dollars.

When we consider that the utilitarian value of soap is purely a cleansing and sanitation function and that for many years it was used unperfumed, we may well wonder why such great importance is placed on the fragrance today. The fragrance is an indication of the needs of our modern civilization. It adds enjoyment to a routine task; makes sanitation more refined; permits greater personal satisfaction just from being clean. Perfume has a psychological effect on the user and, it has already been proved, that scent influences the buying habits of the consumer. Fragrance then plays an important part in enhancing this most utilitarian of products.

The subject of soap perfuming has been widely discussed in the literature during the past quarter century, and one might believe, after studying these works, that little of importance could be added. However, as we move ahead in time and new generations of consumers enter the market, demands change and it becomes necessary to make changes in production to meet these demands. The consumer of today is much more odor-conscious than ever before and even highly functional products such as soaps and laundry detergents must satisfy the acute sense of smell.

Soap perfuming has undergone a major evolution during the past several decades. The use of a proper fragrance can no longer be considered necessary only for the masking of inherent, possibly, unpleasant odors. The perfume today has a dual role. It must act to mask any fatty odor and also must please the aesthetic sense. Once conceived, the perfume must be carefully blended so that it will achieve all that is desired of it when incorporated into the soap or detergent base. This requires a very thorough study of the factors involved and a knowledge of the properties of different perfume materials—both natural and synthetic—in the finished product.

The soap perfumer of today would look askance at some of the perfume formulations used years ago. A typical formula contained large percentages of such natural products as neroli, cassia, cloves, geranium, lavender, patchouli, rosemary, sandalwood and vetiver with only small proportions of coumarin and a few other synthetic aromatic chemicals and isolates. Such formulations were widely used at a time when soap production was not as high as it is today. Were such a formulation submitted today, and we must immediately state that it would not be, sufficient quantities of the natural ingredients would not be available to meet the requirements of present production, and their cost would make their use prohibitive.

Soap perfume formulations today are complex mixtures of a wide variety of natural oils, isolates and synthetic aromatic chemicals with the latter two making up the bulk of the composition. The greater use of these synthetic materials is based on several considerations. First of all, their production is carefully controlled and standardized, thus eliminating changes

in quality often experienced when using essential oils susceptible to quality variation due to soil and weather conditions. There is far less fluctuation in the price of synthetic materials making the cost of the finished product more stable; a very important factor when we consider today's highly competitive soap market. Finally, the use of synthetics permits greater flexibility in the types of odors that can be compounded for soap use. With the synthetics, perfumers can compound the exotic notes so popular today and obtain good stability and performance throughout the life of the soap cake.

Let us now trace the course of a cake of soap from raw material to finished product and outline the problems which face the perfumer who must prepare the fragrance blend to be used. Soap stocks contain different ingredients including coconut oil, tallow, lard, palm oil, olive oil, vegetable and marine oils. Due to the varied and often complicated mixtures of these materials used in the preparation of soaps, soap bases can vary. This has a definite effect on the odor of the soap stock, which is usually not very pleasant. In some cases, the odor of the fat will be evident even after saponification and have a decided residual effect on the finished cake. Marine oils should be hydrogenated before use to saturate the odor-causing unsaturated compounds, but when these oils are used in large quantities, the odor problem still exists.

Rancidity in soap

Most soaps today are processed so that rancidity is avoided. However, in those rare cases when processing does not remove all impurities, rancidity is possible. This is especially true when the impurities present in the soap stock are metals, thus causing contamination and an increase in the tendency toward rancidity. A few parts per million of certain metallic salts in soap will cause rancidity in a very short time unless inhibitors are used to prevent such rancidity. This is an important factor since a rancid soap will either react with the perfume or the odor of the rancid soap will completely overpower the fragrance.

The danger of perfume loss during high temperature production in certain types of soap presents a problem for the perfumer. The heat of the base in its melted stage or the heat of milling can cause loss of the highly volatile components of the perfume and also affect other ingredients which are unstable when heated. This means that the perfumer must select his ingredients accordingly and be familiar with the processing conditions of the soap involved.

Although the modern trend is the use of pastel-colored soap cakes, the problem of coloration and discoloration still exists. This factor has always limited the perfumer to the use of perfume materials known to be non-discoloring. Neither must these tendencies appear after long months of shelf life or upon exposure to the sun when the cake is unwrapped. The danger of discoloration is increased in soaps, due to their alkalinity. Even small traces of free alkali have been known to saponify or decompose some of the less stable perfume ingredients and cause coloration or discoloration, and odor decomposition.

To prevent such actions from taking place, the perfumer must know the properties of the chemicals he

uses. The aldehydes, for example, are troublesome in alkaline products. They are subject to oxidation and may undergo condensing and polymerizing reactions in the presence of some soap ingredients. Cinnamic aldehyde tends to cause discoloration in white soaps due to the reactivity of the alpha hydrogen.

Molecular structure seems to have a strong relationship to the tendency to discolor as illustrated by citral and citronellal. They are alike in structure with one exception—citral has a double bond in the alpha-beta position. Citral is light-sensitive and turns yellow on exposure. In soap, citral produces a yellow-brown color while citronellal causes no discoloration.

Vanillin is known to discolor as does ethyl vanillin but, since the latter has a more powerful odor, it can be used in smaller quantities. Jasmin and neroli compounds show this tendency unless they are specifically compounded for soap use. In these compounds, discoloration tendencies are caused by the presence of indole and methyl anthranilate in the formulation. These products are amines and darken when exposed to light. In soap and other alkaline products and under the influence of light and air, the combination of indole with vanillin or heliotropin will cause a dark red coloration. This same reaction is given by skatole and civet. To avoid discoloration, perfumers avoid using indole in jasmin and neroli blends for white soaps.

The most widely used of the perfume ingredients are the musks. In soap, musk xylol enjoys the widest popularity due to the cost factor. It imparts to the soap a lasting, sweet freshness and is less discoloring than musk ambrette. Musk ambrette is very useful, but its application in white milled soap is curtailed due to its tendency to cause discoloration. Musk ketone causes the least discoloration of the three musks mentioned and imparts a sweet character to the soap. There are other nitrated musks available which can be used in white soaps. Musk Tibetine®, for example, is especially valuable because it is stable to light and, therefore, solves the problem of discoloration in white soaps. The recent development of the polycyclic musks made available musk materials which are stable to light, air, heat and even boiling in dilute alkali and cause no discoloration even after long storage.

A soap perfume contains a well balanced mixture of aromatic chemicals and essential oils. It is interesting to note that some oils and chemicals, when incorporated as is into a soap cake, will dissipate rather rapidly. These same chemicals, however, when used in conjunction with other materials, form a very useful part of the entire blend. A well-balanced perfume in a good, clean soap base will last for many years with little, if any, change in odor character. Usually a certain amount of dehydration forms on the surface of the soap and the scent will appear to be weak. As soon as the soap is used, however, the perfume will be fresh and strong.

We should, at this point, mention the differences in soap bases. The perfumer must be familiar with the varied bases and the odor inherently present in each one. This very odor may often suggest the use of certain perfume materials with which it can be safely blended. Thus, instead of attempting to mask this

odor, he will work with it, using it in creating the perfume concept he desires to achieve.

The liquid soaps have an important place in today's market and they are used by a great many institutions—factories, hospitals, theaters, public buildings, etc. They are primarily mixtures of coconut oil, but can also be made with corn, soybean, palm and other oils as well as the less expensive fatty acids which are saponified with potassium hydroxide. These added ingredients are used as diluents and give the soap greater consistency.

Perfuming liquid soaps requires a definite knowledge of the end use of the product. Although we would recommend a larger concentration of perfume and a more careful selection of consumer-preferred odors, it is quite obvious that the same scent would not be used for a liquid soap used in textile processing, for example, and one used by the public in the better hotels and restaurants. The perfumer, therefore, must create a blend that will not only mask the inherent soap stock odor, but add a distinctive scent to the finished product.

As in the case of bar soap, the perfumer must be familiar with the basic ingredients. A soap that is not of a relatively neutral type will usually have an effect on the fragrance blend. The perfume must also in no way change the clarity of the soap and it must be compatible with, and stable in, free alkali.

Detergents

The advent of the synthetic detergents created new and, in some cases, somewhat more involved problems for the perfumer. As in the case of the soap stocks, detergent materials have distinct odors which would make the product completely unacceptable to the consumer. This is even more important when we consider the detergent bars and the cakes composed of mixtures of soaps and synthetic detergents. In dealing with this class of products, the end use also is a factor in selecting a fragrance type and determining the concentration.

The perfumer encounters more problems in the scenting of the heavy duty laundry detergents in which the pH ranges are high. It is well known that it is very difficult to develop a stable perfume for products with a high pH. The problems involved here are somewhat similar to those encountered in the manufacture of cold process soaps when the perfume is added to the crutcher containing the coconut oil and caustic. In this case, it is necessary to formulate a perfume oil that can withstand not only the strong caustic but the heat encountered during the saponification reaction as well.

In discussing the perfuming of synthetic detergents, we must cite the many different methods of production and the many varied raw materials involved in their manufacture. The most recent compilation of these products included hundreds of different materials with recommendations for their use for almost every conceivable purpose. We must mention, even at the risk of being repetitious, that the perfumer must consider the odor usually attributed to the detergent base and also the end use to which the given product will be put.

The light duty detergents for washing dishes by

hand must be chemically mild with an appealing fragrance that is not incompatible with foods and their odors. The fragrance must not be so residual that it will remain on the dishes even after they are rinsed. Detergents for use with automatic dish washers can be somewhat stronger chemically since there is no apparent contact with the hands. Odor preferences lean toward a mild, clean scent.

Most difficult of the detergents to perfume are the heavy duty laundry types. Some of these products have a pH between 11 and 12 which limits the choice of perfume materials that can be used. We have evaluated a large group of aromatic chemicals, essential oils and perfume compounds in heavy duty detergents with a pH range of 10 to 11 and observed them for a period of twelve months. These exhibited good stability during the test period. For detergents having a pH above 11, we found that a more careful selection of perfume materials must be made.

The subject of fixatives in soap has been widely covered in the literature, leaving very little that we can add here. Studies have been made on the rate of evaporation of the perfume materials from soap cakes, but it is very difficult to limit or completely eliminate this problem. The soap base itself retards evaporation to some extent, but a major improvement has been the foil wrapper now widely used on soap cakes. The old-type paper wrappers were very ineffective since they permitted the permeation of the soap fragrance thus causing loss of scent during normal shelf life. The foil wrapper eliminates permeation and has, therefore, aided in odor retention. However, we must mention again that it is almost impossible to stop the evaporation process completely with presently known materials. Furthermore, some evaporation may be necessary to enhance the attraction of the product to the consumer.

Soap and detergent perfuming is complex

We have tried to show that soap and detergent perfuming is a complex, technical procedure which can be successful only if the practicing perfumer has a thorough knowledge of all the problems involved, is familiar with manufacturing methods, and is made aware of the end use of the product. The perfumer must also have a keen knowledge of all existing perfume materials and their applicability to the material being perfumed. Furthermore, he must continuously evaluate the newer aromatics in this application.

We must also mention that the perfuming of soaps and detergents, including the liquid types, requires that each fragrance be custom-made to meet the individual requirements of the product to be perfumed. Experience has shown that a fragrance made for one specific product will not always give the same results if used in another material.

In considering soap perfuming, one thing becomes immediately evident; the importance of synthetics. During the past decade, important advances have been made in the development of synthetic perfume materials which have made available odors long sought by the perfumer. These new chemicals have already become of some importance to the soap perfumer and will certainly be joined by others now in development.

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Roy R. Failla is research associate at the Technical Service Laboratories of Union Carbide Chemicals Company, division of Union Carbide Corporation, Tarrytown, N. Y. He joined the firm as a technical correspondent in 1955; worked in several sales offices; and was transferred to the laboratory last year. He was graduated from Seaton Hall University with a BA in Chemistry.



Triethanolamine Soap Emulsions

By ROY R. FAILLA,
Research Associate
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TRIETHANOLAMINE SOAPS, old-timers in the formulation of cosmetics and household specialties, continue their position of importance for formulators despite the advent of many valuable formulation components during the past two decades. Few materials can match the triethanolamine soaps for their combination of economy, cleaning properties, foaming properties, gentle skin action, and utility as emulsifiers for products containing oils, waxes, or greases.

Emulsions prepared with amine soaps are distinguished by their small particle size, ease of preparation, non-corrosiveness, wide flexibility in formulation, and stability on long storage. They are only slightly affected by temperature variation, and can be made in concentrated form that is readily diluted with water.

The uniformity in the small size of the oil particles is invaluable in the manufacture of products that must be even-spreading or penetrating. These emulsions are essentially neutral in their reaction—important since it means that they will not be corrosive to metals nor injurious to skin or alkali-sensitive textiles.

The major contribution of amines to the emulsion field has been simplification of the emulsion technique. As a result excellent products can be prepared with reproducibility and ease without long practice.

Amine soaps vary in consistency depending upon the fatty acid used. The softer soaps, particularly the oleates, have the outstanding property of being both water- and oil-soluble. These can be incorporated into oil and organic solvents to form "soluble" oils, dry-cleaning soaps, and textile scouring and wetting agents.

Among the physical properties of greatest interest to formulators of detergents, textile specialties, and cosmetics is the low alkalinity of water solutions of

triethanolamine soaps, shown in Table 1 as contrasted to other types of fatty acid or ester soaps. Moreover, they act to lower the alkalinity of sodium or potassium soaps when combined with them. The amine soaps are, for the most part, water-soluble and their solutions have excellent detergent powers fitting them for textile and cosmetic uses. As surface-tension depressants, they have desirable penetrating and emulsifying qualities.

Amine soaps are usually prepared with oleic acid or stearic acid as these fatty acids are readily available to the formulator. Oleic acid is used in emulsifying liquids or waxes where a low-viscosity emulsion is desired. Stearic acid is more effective with waxes and viscous materials and can be used in the emulsification of solvents and oils where a high-grade, colorless, and odorless product is desired.

Triethanolamine forms soaps with free fatty acids in direct molecular proportions. Triethanolamine oleate has the consistency of petrolatum. Its solutions in water or in organic solvents, such as gasoline, show marked detergent properties. Triethanolamine oleate is soluble in water in all proportions but is not completely soluble in gasoline below 2% concentration.

Triethanolamine stearate is a hard, white product that finds use in cosmetic preparations. This soap is

TABLE 1.
pH of 2.5 Grams Soap in 97.5 Grams Water

Sodium Stearate	9.9
Monoethanolamine Oleate	9.45
Potassium Coconut Oil Soap	9.4
Morpholine Stearate	9.05
Triethanolamine Stearate	8.87
Triethanolamine Oleate	8.8
Triethanolamine Coconut Oil Soap	8.3

1.
and
2.
4.5;
5.

Wax

practically neutral, having a pH of about 8. It is free from irritating effects to the skin and free of injurious effects on fabrics.

The usual requirements for emulsification are between 2 and 4% triethanolamine and 5 to 15% oleic or stearic acid, each based upon the weight of the material to be emulsified.

Oil and solvent emulsions

Triethanolamine has a dual value in the formulation of sulfonated oils, such as sulfonated olive, castor, neatsfoot, and other vegetable oils and emulsions. Low solubility properties of the sulfonated oils in other vegetable or mineral oils to be emulsified requires from 10 to 30% free fatty acid to obtain miscibility. The added free acid, however, decreases the emulsifying properties of the "soluble" oil and increases the inert material content. Triethanolamine, added to neutralize some of this excess acidity, forms a triethanolamine soap which in turn gives greater miscibility and much greater emulsifying action with less free fatty acid.

In the processing of wool, the use of triethanolamine in wool lubricant emulsions offers many advantages. Formulation of the dispersion of oil in water is simplified, the oil is more finely dispersed, and the resulting emulsion is more stable. The triethanolamine soaps remain with the oils, thus the lubricating film on the fiber is uniform and easily removed during scouring. The fact that the triethanolamine soap emulsifying agent is only mildly alkaline and harmless to textile materials is important also.

Striking results have been obtained with the use of triethanolamine as an adjunct to sulfonated neatsfoot oil for leather fat-liquoring. The soap gives a high degree of dispersion of the dilute oil-in-water emulsion, gives a stable emulsion, and consequently reduces the time required for the fat-liquoring process. The leather produced has much greater pliability showing a deeper and more even distribution. As an added advantage, only a small amount of triethanolamine and oleic acid is needed and the emulsion can be made up as a cream that can be diluted in the liquoring bath to give an extremely fine dispersion.

Nine typical oil emulsions using triethanolamine and oleic acid are shown in Table 2. In each case, stearic acid can be substituted for oleic acid.

Triethanolamine oleate soaps add good detergent power and give a uniform dispersion of solvent in solvent emulsions of chlorinated solvents, pine oil, and kerosene in water. Such emulsions combine the properties of an active solvent with the detergent effect of a water solution of soap. Solvent emulsions

are of value in textile scouring and wetting out, in cleaning paint and metal surfaces, and for household applications such as the scouring of woodwork, linoleum, and rugs.

With hydrocarbons, triethanolamine soaps produce stable oil-in-water emulsions that can be diluted with water as desired. Water-in-oil emulsions usually can be produced with triethanolamine oleate if the amount of oleic acid is increased and the proportion of water to solvent is decreased. Further dilution, then, is more easily done by adding solvent rather than water.

Chlorinated solvent emulsions are fairly viscous and permit further dilution with water as desired. Though the triethanolamine soaps are good emulsifying agents, traces of hydrochloric acid, slowly liberated by the action of water on the chlorine compound, decompose the triethanolamine soaps. Because of this unstable condition, chlorinated solvent emulsions made with triethanolamine soaps cannot be stored indefinitely, but are satisfactory for use within a few weeks of manufacture.

Table 3 illustrates six typical solvent emulsion formulations suggested as a working basis.

"Soluble" oil emulsions

Triethanolamine oleate is useful as a constituent of "soluble" mineral oils such as those used to lubricate and cool cutting tool operations, make soluble greases, lubricate textile fibers during processing, and make insecticide and herbicide concentrates and as used in cosmetic creams, shampoos, and similar preparations where an emulsifiable oil film and stable oil emulsion are desired.

The triethanolamine oleate is partially soluble in the oils and seldom requires more than a few per cent of excess fatty acid to hold it in solution. Properly formulated, no soap-oil separation will take place. Too, the oil is quite neutral and will not corrode metals or harm textile fabrics. When sodium or potassium soaps are used, mutual solvents, together with a large excess of fatty acid, are usually needed. If the mutual solvent evaporates, the soap is thrown out of solution. Ammonium soaps are more soluble in oils, but have no stability on standing.

Medium viscosity mineral oils usually require from 3.5 to 4.0% triethanolamine, depending upon the stability desired in the emulsion. Between 8 to 11% oleic acid is used, varying with the special type of oil to be "solubilized." More highly refined oils are more difficult to emulsify than standard grades.

Two typical "soluble" mineral oil compositions are: (proportions by weight)

TABLE 2.
Typical Triethanolamine Oleate Oil Emulsions
(Weight Proportion Basis)

Oil (Type and Amount)	Triethanolamine	Oleic Acid	Water
Castor Oil	82	2.1	16
Cottonseed Oil	88	2.1	10
Lard Oil	87	3.2	10
Linseed Oil	88	2.1	10
Olive Oil	88	2.0	8
Neatsfoot Oil	88	2.1	10
Pine Oil	91	3.2	6
Lubricating Oil	89	2.1	7
White Mineral Oil	82	4.3	12
			100

TABLE 3.
Typical Hydrocarbon and Chlorinated Solvent Emulsions
(Weight proportion basis)

Hydrocarbon Solvent	Amount	Triethanolamine	Oleic Acid	Water
Kerosene	89	3.2	10	100
Naphtha	82	4.3	14	100
Creosote	88	6.0	12	100
Chlorinated Oil Solvent				
Ethylene Dichloride	86	4.3	10	100
Dichlorethyl Ether	83	7.0	14	100
Propylene Dichloride	86	6.0	14	100

- Light mineral oil, 88; triethanolamine, 3.8 to 4.0; and oleic acid, 8.0 to 10.0.
- White paraffin oil, 85; triethanolamine, 4.2 to 4.5; and oleic acid, 10.0 to 12.0.

Wax and grease emulsions

Emulsions of wax and grease are becoming more popular because of their low cost and low flammability compared with hydrocarbon solutions of these materials. Uniform, finely dispersed, and readily dilutable concentrated emulsions of waxes, greases, asphalt, and other semisolid materials can be prepared, using triethanolamine soaps.

Stearic acid is generally preferred for the emulsification of hard waxes. Oleic acid produces less viscous and usually less stable emulsions, but can be used to advantage when a more concentrated emulsion of a wax or grease is desired.

Low viscosity wax emulsions can be made with triethanolamine stearate or triethanolamine oleate, the stearate giving the more viscous and more stable emulsions. Table 4 illustrates a dozen typical wax and grease emulsions. Substitution of oleic for stearic

TABLE 4.
Typical Wax Emulsions made with
Triethanolamine Soaps
(Weight Proportion Basis)

Wax and Amount—Viscous Emulsions		Triethanolamine	Fatty Acid and Amount	Water
Beeswax	88	3.2	Stearic 9	300
Carnauba Wax	87	4.9	Stearic 9	400
Japan Wax	85	3.2	Stearic 12	400
Paraffin Wax	88	3.5	Stearic 9	300
Lanolin	80	5.4	Stearic 15	200
Petrolatum	88	3.5	Stearic 9	100

Wax and Amounts—Low-Viscosity Emulsions				
Paraffin Wax	45	Carnauba Wax	3	6.0
Paraffin Wax	45	Beeswax	3	6.0
Paraffin Wax	40	Carnauba Wax	4	6.0
Carnauba Wax	15			1.5
Beeswax	15			1.5
Japan Wax	15			1.5

Stearic 13.5 225
Stearic 13.5 225
Oleic 11.0 225
Oleic 2.3 90
Oleic 2.6 100
Oleic 3.0 100

TABLE 5.
Cleansing, Vanishing, and Cold Cream Formulations
(Weight Proportion Basis)

	Column 1 Cleansing Cream	Column 2 Vanishing Cream	Column 3 Cold Cream
Stearic Acid (Cosmetic Grade)	29.0	20.0	50.0 40.0
White Mineral Oil	50.0	100.0	30.0
White Beeswax			33.0
Lanolin (anhydrous)	8.0	14.0	9.0 20.0
Terpineol	0.1	0.2	0.1 0.2
Triethanolamine	3.8	2.5	2.7 2.7
Propylene Glycol	10.0	10.0	18.0 18.0
Water (distilled)	100.0	54.0	120.0 120.0
			95.0

TABLE 6.
Polyglycol Cream Base Formulation
(Weight Proportion Basis)

Carbowax* Polyethylene Glycol 1500	13.5
Stearic Acid	11.5
Lanolin	4.0
Terpineol	0.1
Triethanolamine	1.0
Potassium Hydroxide	0.5
Propylene Glycol	10.0
Cellosize* Hydroxyethyl Cellulose WP-3	0.7
Zinc Stearate	5.0
Perfume	0.2
Water	53.5

acid permits formulating a considerably higher concentration of wax or grease in the emulsion because of the lower viscosities of the oleate-formed emulsions.

Cosmetic emulsions

Creams, lotions, and other skin preparations are improved in appearance when they are presented to the customer as white, uniform emulsions. These products may be given any desired texture and consistency, have long shelf life, and permit easy incorporation of water-soluble materials into an oil base.

Triethanolamine soaps are excellent emulsifying agents for cosmetic preparations. The resulting emulsions are essentially neutral and have no injurious effect on the skin. They give creams of desirable texture and consistency that are unaffected by moderate changes in temperature. Mineral oils, petrolatum, lanolin, vegetable oils, beeswax, and other ingredients can be dispersed evenly in an emulsion without losing their inherent properties. The resulting preparations can be removed from the skin by washing with water. The detergent properties of the amine soap impart a cleaning action to the cream.

The proportion of the triethanolamine must be correct. A deficiency of the amine is indicated by a thin emulsion that is usually less stable than desirable and may not be removed readily from the skin by water. An excess of the amine may give a granular cream that tends to separate on cooling.

Cleansing creams have a fairly high content of mineral oil to dissolve grease and suspend dirt particles so that they may be removed readily from the skin by a cloth or absorbent paper. A high proportion of triethanolamine serves, with the fatty acid, to emulsify the mineral oil completely, aid penetration of the cream into skin pores to remove dirt, and form a cream that is easy to remove from the skin with water. The propylene glycol in the formulation (see Table 5, column 1) assists in coupling the oil and lanolin into the soap and water, maintains the physical properties of the cream during storage, and enhances the emollient action upon the skin.

Vanishing creams should spread easily and give a soft, smooth feel to the skin. The film should not show on the skin, but should give an effective powder base to afford some protection against wind and sun. The high percentage of stearic acid in the formulations (see Table 5, column 2) serves to give an excess over that needed to form triethanolamine stearate emulsifier. This excess acid gives a "dryness" and pearliness to the cream.

Cold creams are somewhat similar to cleansing creams. They usually contain a mixture of fats and waxes of the saponifiable type and less mineral oil. The suggested formula (see Table 5, column 3) produces a smooth, stable cream that is more viscous than the cleansing creams. It is easily removed with a soft cloth or absorbent tissue or can be washed from the skin with water.

Table 6 illustrates the formulation of useful vehicles to which active cream ingredients may be added to impart desired cosmetic properties. The base of these creams is a water-soluble polyethylene gly-

col. Polyethylene glycol 1540 may be substituted for polyethylene glycol 1500 to give thicker products with greater capacity for added liquids. Triethanolamine stearate is the emulsifying agent in this formulation.

The mild alkalinity of water solutions of triethanolamine soaps makes them excellent emulsifying agents for brushless shaving creams. These creams have good softening, wetting, and lubricating properties. Such creams should be soft enough to wet and spread on the face quickly and smoothly, but should not drop from the skin when they are applied to the wet face or while shaving. They should lubricate the razor as well as the skin, yet be readily removable with water. Such a brushless shaving cream formulation is shown in column 1 of Table 7.

Column 2 of Table 7 gives the formulation for a hand lotion or "all-purpose" cream, as well as a cleansing cream. The lanolin is soothing to chapped or dried skin. Although this cream may require more massaging into the skin to eliminate stickiness than some hand lotions, the softening and soothing compensates for the extra effort.

Two formulations for industrial "waterless" hand cleaners are shown in column 3 of Table 7. These cleaners are very viscous emulsions of mineral oil and water. These triethanolamine oleate-formed emulsions have a gel-like structure but are soft enough for easy application and are usually removed without the use of water. The addition of Tergitol nonionic NPX* increases stability of the emulsions against freezing and improves rinsing properties. An increase in water content in the cream gives a softer product. The lanolin content reduces the defatting action of the mineral oil in the skin.

Detergent emulsions

Emulsification is one of the principles employed in the removal of oils, stains, and soil with detergent formulations. Such systems are designed so that emulsification takes place during the detergent operation. Water is the vehicle or carrier for the soil or stain which is "lifted" and dispersed by the emulsifying agent.

Triethanolamine oleate soap and triethanolamine coconut oil soap serve as both emulsifying agents and detergents in the hair shampoo concentrate formulations shown in column 1 of Table 8. The blandness of the soap is ideal for this use. These concentrates are liquids with a clear, reddish color which will darken on standing. Addition of tetrasodium pyrophosphate to the water used to dilute the concentrate will prevent some of the discoloration. The propylene glycol in the formulation serves as a coupling agent to make a liquid concentrate. If terpineol is used to mask the soap odor, less perfume will be needed.

Amine soaps plus synthetic detergents and a solvent coupling agent give excellent shampoos for cleaning rugs and upholstered furniture. The copious lather produced with water solutions of this shampoo washes easily and does not harm the fabric or coloring. The Tergitol nonionic NPX helps maintain the dispersion of insoluble soaps when the shampoo is

used in hard water. A typical rug shampoo formulation is illustrated in column 2 of Table 8.

When a chlorinated or hydrocarbon solvent is combined with triethanolamine oleate soap, an excellent rug and carpet cleaner is produced for use in commercial plants. This emulsion of solvent, soap, and water removes grease, tar, and paint more readily than does soap and water. The emulsion can be stored indefinitely without separation. Column 3 of Table 8 illustrates a commercial rug cleaning shampoo.

Triethanolamine soaps are soluble in both naphtha and perchlorethylene, a prime requisite of a dry-cleaning soap. The formulation shown in column 4 of Table 8 gives a dry-cleaning soap that is soluble in naphtha in all proportions.

As it is more completely saponified than the usual dry-cleaning soaps, it is more concentrated and less is needed. Butyl Cellosolve* is used because it is a particularly effective coupling agent for the addition of water to a dry-cleaning soap. It also assists in removing water-soluble stains and aids in brightening the colors of garments.

TABLE 7.
Brushless Shaving, Hand Lotion, and
Waterless Cleaner Creams
(Weight Proportion Basis)

	Column 1 Brushless Shaving Cream	Column 2 Hand Lotion, "All-Purpose" Cream	Column 3 "Waterless" Hand Cleansers
Stearic Acid (triple-pressed)	35.0	10.0	
Oleic Acid			12.5 10.5
Mineral Oil†	7.5	23.0	40.5 40.5
Lanolin (anhydrous)	6.5	13.5	
Terpineol	0.1	0.1	
Tergitol® Nonionic NPX			5.0 6.0
Triethanolamine	2.2	3.8	3.1 2.6
Monooethanolamine			1.3
Borax	2.2		
Quince Seed Mucilage			7.5
Propylene Glycol	4.0	30.0	5.0 5.0
Water	145.0	125.0	50.0 50.0

TABLE 8.
Detergent Emulsion Formulations Using
Triethanolamine Soaps
(Weight Proportion Basis)

	Column 1 Hair Shampoo Concentrates	Column 2 Rug Shampoo Concentrate	Column 3 Commercial Rug Shampoo	Column 4 Amine Dry Cleaning Soap
Coconut Oil Fatty Acids	42 42.0	21.0		
Oleic Acid	56 56.0	28.0	28	107.0
Propylene Glycol	55 55.0			
Triethanolamine	58 28.5	14.0	16	21.0
Monooethanolamine	12.6	6.8		
Tergitol Nonionic NPX*		5.0		
Isopropanol (99%)		30.0	14	
Ethylene Dichloride			13	
Butyl Cellosolve*			5	27.0
Cleaner's Naphtha or Perchloroethyl- ene				25.0
Potassium Hydroxide (100% basis)				8.3
Water		15.0	125	13.5

*Registered trademarks, Union Carbide Corporation

†White Mineral oil for shaving cream and hand lotion

Composition of Modern Detergent Bars

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MAN HAS NO DOUBT ALWAYS felt the need for some substance to aid him in washing his body and his clothes. This need, for well over a thousand years, has been met by soap, the origin of which is lost in the mists of antiquity. The Romans seem to have learned about it from the Gauls, who used a crude soap as a pomade to give a reddish tinge to their hair. But it is Galen, the great Greek physician, who is given credit for the first authentic mention of soap as a cleansing agent. He stated that it was made from tallow, wood-ash lye and lime. Records going back to 2800 B.C. (1), which have recently been deciphered, describe the preparation of a potash soap for fulling and washing woolen cloth.

In any event, a flourishing soap industry, which gradually spread to the northern Italian coastal cities, was in existence at Marseilles as early as the 9th century A.D. From the earliest times, especially in northern climates, housewives have made soap by boiling waste fats with lye (obtained by leaching the wood ashes from the fireplace) with water. Since the principal saponifying ingredient in wood ashes is potassium carbonate, the products are what we call soft soaps, which have a pasty or jellylike consistency. The soap makers of Marseilles and the Italian coastal cities, however, obtained their lye by burning seaweed, so that the products were hard soda soaps similar to those with which we are familiar, and thus suitable for shipment and well-adapted as articles of commerce. For this reason they were in great demand throughout Europe.

Up until the 19th Century, after the discovery of the process for making soda ash from common salt by Nicholas Le Blanc, the soap industry underwent little change. Soap was produced either at home or in small local establishments, and it was only during the last century that soap making became a giant industry, concentrated for the most part in large man-

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ufacturing plants. Furthermore, as a consequence of the much wider knowledge of the chemistry of fats, which originated with the researches of Chevreuil in the early 1800's, the quality of soap and soap products improved at an increasingly accelerated rate. To-day a bar of fine toilet soap is one of the highest quality and most uniform articles of commerce available.

Up until World War I the only commercially available surface-active compounds were soaps and the sulfonated oils. Since the latter were confined to industrial uses, mainly in the processing of textiles and leather, and lacked detergent properties, soap was the only detergent the market afforded.

The Allied Blockade which cut Germany off from access to foreign sources of fats and oils during the war, provided her chemists with the incentive to work on the development of detergents derived from non-fat sources. The meager domestic supply of fats was too greatly needed for foodstuffs to permit its use in the making of cleansers. At least one patent disclosing the preparation of a synthetic detergent was filed during the war, but the efforts of German chemists came too late to have any appreciable effect in alleviating the fat shortage before the war ended. When fats became available again after the war, the problem became less urgent.

However, it had been demonstrated that surface-active agents could be made from non-fat raw materials and this aroused the interest of industrial chemists, especially those working for the textile industry. This industry is an enormous consumer of soap, and in Germany at that time it suffered a major economic loss due to the prevalence of hard water in many parts of the country where textile mills were located.

The two decades following World War I saw the rise of a new industry, that of surface-active agents or surfactants, compounds which are also frequently

called synthetic detergents, wetting agents, emulsifiers etc., depending upon their specific applications. By 1930, German chemists had synthesized almost all of the basic chemical types of surfactants in use today. At about this time, American chemists also got into the picture and the large scale development of these products began in earnest. The first low-priced synthetic detergent made entirely from non-fat raw materials, dodecyl benzene sodium sulfonate, was soon developed in this country (2) and began to replace soap for industrial use.

Up until the end of World War II, the synthetics were confined almost exclusively to industrial uses where they enjoyed a sizable and widely diversified market. Hundreds of different kinds of surfactants were sold to the textile industry and gradually spread into other fields such as cosmetic, food, leather, metal cleaning, paint, etc.

For some time past, soap had been sold not only in bar form but in packaged form as powders, flakes, and, with the advent of spray drying during the 1920's, in bead form. The synthetics were first put on the market in packaged granular form, usually consisting of 30-40% active ingredient, along with sodium sulfate.

The physical properties of the synthetics were not suited to production of the materials in bar form. In fact, for industrial uses there would have been no advantage in producing them in this form.

Hard water and soap

Soap, which in this writer's opinion, is the queen of detergents, suffers from the disadvantage that it precipitates as a sticky curd in hard water. This is due to the formation of insoluble calcium and magnesium soaps by the interaction of the soluble sodium soaps with hard water salts. As we have already seen, this not only occasions an economic loss in industry where soap is used in hard water areas, but is also objectionable in the household where it produces "bathtub ring" and deposits a slimy precipitate on the skin, hair and fabrics.

Toward the end of World War II, the synthetics, which are far less sensitive to hard water and accordingly lack the said disadvantage of the soaps, were introduced into the consumer market especially for use in hard water areas. The use of the recently developed condensed phosphates as builders or additives quickly followed. Tripolyphosphate, the most widely used of the condensed phosphates, provides pronounced water-softening properties as well as increases the detergent action of the synthetic.

The built synthetic detergents were so successful in the consumer field, that the tail soon began to wag the dog and what had been an insignificant market for the synthetics became their major outlet, growing with incredible rapidity at the expense of soap. In the year 1953 the volume of the synthetics surpassed that of soap and now amounts to about 75% of the total soap and detergent market.

Soap, however, still held one area pretty much to itself, that of bar form toilet soaps. The physical properties of the synthetic detergents do not lend themselves to the processes of milling and plodding used in the manufacture of fine toilet soaps. The

anionic type synthetics unless mixed with salts are apt to be pasty, tacky masses. The more recently developed non-ionics are liquids or thick pastes. Neither class is adapted to milling and plodding without admixture with other materials. Furthermore, the synthetics lack the smooth greasy feel of soaps and are often such efficient emulsifiers that they defat the skin, leaving it with a harsh feel. On the other hand, the synthetics generally have a lower pH than soaps, making it possible to use them as bases for detergents with a pH much closer to that of the skin.

According to several authorities (3) attempts to make detergent bars containing synthetics go back about 25 years, although efforts to commercialize milled synthetic bars did not begin until about 12 years ago. The first bar synthetics were the salt water soaps developed for the Armed Forces during World War II, after coconut oil (the base for the traditional cold water and salt water soaps) became scarce following the advance of the Japanese into the Philippines. One of these products consisted of a mixture of tallow soap with a substantial proportion of the pioneer alkyl aryl sodium sulfonate, "Nacconal", which was already in large scale production for the textile industry.

Synthetic detergents have other physical characteristics, in addition to those already referred to, which militate against their use in bar form. For one thing, their rate of solubility is much greater than that of soaps. A cake of pure synthetic generally dissolves far too quickly to make a satisfactory hand soap and will disintegrate if left standing in the wet soap dish.

Synthetic detergents also have a harsh feel and assume a rough surface after use. They lack the slippery feel of soaps, to which we have become accustomed, as well as the lubricity of soaps which prevents undue wear of fabrics during the mechanical action of washing. Also, they tend to irritate the skin, not only because they remove the natural oils so efficiently, but because they do not leave a protective layer of fatty material on the skin as soap has been shown to do (4). On the other hand, the synthetics rinse much more readily than soaps and do not have as high a pH as soaps.

Additives needed for synthetic bar

It is evident, therefore, to produce a bar-form synthetic detergent of satisfactory consistency requires the addition of other substances to the pure synthetic, one of which may be soap. Flett, Morgan & Hoyt (5) have called attention to the fact that the properties of soap and the synthetics complement each other and they stress the value of the soap-synthetic mixtures. Two distinct classes of bar synthetics are then possible, a soap-synthetic combination bar and a bar comprising a synthetic detergent mixed with suitable ingredients other than soap. Each type presents problems peculiar to itself.

Mayhew & Yeager (6) have defined the properties desirable in an all-purpose detergent bar as follows:

1. Good detergency on the human skin, and fabrics; and hard surfaces in all kinds of water including hard, soft, sea, cold, hot.

2. Good soap-like lathering qualities in all types of water, particularly when used on the skin.
3. Mild and not injurious to the skin.
4. Little or no tendency toward softening, blooming, crystallizing, cracking, drying or decomposing under ordinary use and storage conditions.
5. Pleasing appearance, feel and odor.
6. Ability to be produced in standard soap-mixing equipment.

Two additional requirements recently cited by McCutcheon (3) might also be added, a specific gravity close to that of soap and a pH nearer to that of the skin than soap.

From what has already been said concerning the properties of synthetic detergents, it will be clear that foregoing requirements are somewhat ideal and difficult to realize completely in practice. Even the best synthetic bars now on the market are lacking to some extent in one or two of them.

The patent literature discloses compositions for a large number of bar-form detergents, most of which have undoubtedly not resulted in commercial products. Schwartz, Perry & Berch (7) point out that the compositions of certain widely advertised bars are closely guarded, nor do they appear to be the subject of any particularly revealing patents. They attribute this situation to the fact that a large number of potentially valuable combinations have already been disclosed in earlier literature, and that much unpatentable know-how and production skill are involved in the making of a really satisfactory detergent bar. This is illustrated by a recent statement of McCutcheon (3) to the effect that moisture control is extremely critical for most synthetic formulations, plus or minus as little as $\frac{1}{2}$ of 1% often making the difference between a rubbery mass and a soft putty, both equally difficult to mill.

The following summary of both classes of detergent bars selected from the United States patent literature will serve to illustrate the variety of combinations of materials which have been more or less successfully used in the preparation of these products.

Combination soap-synthetic bars

As early as 1945 Flett (8) disclosed a combination soap-synthetic bar containing as high as 50% synthetic ("keryl" benzene sodium sulfonate) which could be prepared by milling, plodding and pressing the mixture in standard soap-making equipment. Hoyt (9), using a similar mixture of soap and synthetic, claimed the improvement of incorporating starch into the combination. The workability of the mixture during milling and plodding was controlled by maintaining the amounts of soap, alkyl aryl, starch, inorganic salt and water within definite limits.

Preston discloses (10) the use of allyl esters of fatty acids such as allyl laurate to inhibit lime curd formation in soap-syndet compositions. Milled bars of the following composition are stated to form no curds in 20 grain hard water:

Soap	50 parts
Syndet (sulfated coconut fatty alcohols)	40 parts
Allyl Laurate	10 parts
Water	4 parts

The mixture without allyl laurate gave curds, and soap alone is said to have no curd-inhibiting power.

Marshall (11) discloses a method for making a detergent cake consisting of two halves mechanically locked together, one comprising a soap and the other a synthetic detergent. In another patent (12), the same inventor describes a somewhat similar product consisting of a multibar made up of alternate layers of microcrystalline soap and synthetic detergent cold-welded together.

A process for the preparation of a soap-synthetic mixture consisting of soap plus sulfated monoglyceride is disclosed in a patent to Heald (13). In one example a combination bar is prepared by mixing 83.5 parts of soap chips, 15 parts of monoglyceride sulfate base containing minor amounts of sodium sulfate, adding water to 15% moisture, milling, plodding and extruding the product at about 100 F, following which bars are prepared for use.

Combination bars comprising soap and sulfated monoglyceride in admixture with other synthetics are disclosed in patents issued to Faier and to Becher. The Faier patent (14) describes a combination of a major amount of soap and a minor amount of a mixture of water-soluble synthetic detergents comprising a sulfated higher fatty acid monoglyceride and a higher fatty acid amide of aminomethane sodium sulfonate. Certain examples also include dodecyl benzene sodium sulfonate.

The Becher patent (15) also calls for a major amount of soap and a minor amount of synthetic detergents comprising a sulfated fatty acid monoglyceride; a non-ionic, based upon polyoxypropylene glycol reacted with enough ethylene oxide to make it water-soluble; and a condensation product of ethylene diamine and propylene oxide together with 10-80%, by weight, of ethylene oxide. The object was to get a product resistant to sloughing but with properties which permit milling and plodding.

Mayhew and Yeager (6) disclose the composition of an all-purpose detergent bar, which is illustrated by one of their claims:

Sodium dodecylbenzene sulfonate	10 parts
Calcium stearate	50 parts
Sodium diisopropyl naphthalene sulfonate	5 parts
Sodium diethylsulfosuccinate	5 parts

In addition to the foregoing ingredients, gums, starch or carboxymethyl cellulose may also be added. In a second patent (16), the same inventors disclose a bar comprising the same ingredients except that the calcium stearate is replaced by ordinary soap.

The form of cake used in one of the foremost synthetic bars on the market is described in a recent patent to LeVier and Kohn (17). Both sides of the major surfaces are curved only in one direction, the curvature being effected in mutually perpendicular directions so the cake may be clasped comfortably in the hands while in the washing position.

The detergent composition used in the preparation of the aforesaid bar is disclosed in U. S. Patent 2,894,912 (18). It comprises a major portion (upwards of 50%) of the alkali metal salts of esters of isethionic acid with mixed higher fatty acids, having mostly 12

to 18 carbon atoms; an anionic detergent (such as an alkyl aryl sulfonate or fatty alcohol sulfate) as a suds booster; a small amount of soap and a larger proportion of triple pressed stearic acid or polyethylene glycol as a binder. Of course, sodium sulfate and the conventional additives as perfume, pigments etc., are included.

"All synthetic" bars

An early patent (19) of this class describes a cake form detergent composition consisting of a mixture of boric acid and a synthetic detergent, the latter being a fatty alcohol sulfate or similar anionic. Another patent belonging to the same period (20) discloses a mixture of the sulfated fatty alcohols derived from coconut oil together with fatty acid mono- and diglycerides for the preparation of a milled bar. Adding finely divided sodium or potassium chloride to the latter composition overcomes its tendency to become slimy in use is claimed in a later patent (21). A detergent bar composed predominantly of sulfated diglycerides of long chain fatty acids is disclosed by Dreger and Bell (22).

A method of overcoming the tacky feel of alkyl aryl sulfonates by the addition of lecithin is disclosed in a patent issued to Keenan (23), although his compositions also contain other ingredients such as starch and polyethylene glycol. A moldable solid consisting of a simple mixture of dodecyl benzene sodium sulfonate and a glycol is claimed by Walters (24), and the use of sodium alginate as an emollient in compositions of the same type is disclosed by Van Dijck and Geyer (25).

Barker in a series of three patents discloses the use of urea in conjunction with various non-ionic surfactants for the preparation of bar-form detergents. In the first (26) a mixture of a polyoxyethylene ether of sorbitan monolaurate, a polyoxyethylene ester of stearic acid and urea were used. The second discloses a composition containing a polyoxyethylene thio-ether and urea (27), and the last (28) makes use of a polyoxyethylene ether of hydroabietyl alcohol in combination with urea.

In the preparation of a detergent bar composed mainly of sulfated monoglycerides, Turck (29) claims the improvement of drying to a moisture content of not more than 5% and adding solid plasticizers, zinc stearate and diethylene glyco monostearate followed by milling and plodding in the usual manner. A later patent to Schmolka (30) is also based upon sulfated monoglycerides containing less than 1% free fatty acids together with the same plasticizing materials.

A cake detergent made by subjecting alkali metal salts of di-n-octyl-, di-n-nonyl- or di-n-decyl sulfosuccinates to pressures greater than 100 psi is disclosed in a patent to Vitalis (31). Weil, Stirton and Maurer (32) describe a synthetic detergent bar, the major ingredient of which is a mixture of the sodium and triethanol ammonium salts of α -sulfonated fatty acids. A very early disclosure covered a combination bar comprising a mixture of soap and a salt of an ester of an α -sulfonic acid. It appears in a patent to Kise and Vitcha (33). At that time, however, α -sulfonic acids were more or less laboratory curiosities and have only recently become commercial products on the

basis of the work of Stirton and his associates at the Eastern Regional Research Laboratory of the Department of Agriculture.

The annual U. S. toilet soap market is said to amount to 500,000,000 pounds (3), a fact which naturally renders the field attractive to the manufacturers of synthetic detergents, especially the markets in hard water areas where soap is at a disadvantage. As we have seen, the problems involved in duplicating the desirable physical characteristics of soap with a synthetic detergent combination have been formidable, and up to the present, the synthetics are considerably higher priced than soap. However, there are at least three high quality synthetic bars on the market and research still goes on. It is therefore safe to predict that synthetic or combination bars will take a larger share of the future toilet soap market.

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Modern Trends in Deodorant Soaps

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SINCE THE LAUNCHING of Dial soap in 1948, there has emerged a whole new concept of personal hygiene. The incorporation of a soap-active bacteriostat into a toilet soap made possible, for the first time, not only the removal of gross soil from the cutaneous surface, but also provided a means for the control of cutaneous bacterial populations.

Promotion of such a soap as an effective means of controlling perspiratory odors, rather than as a medicated soap for strictly antiseptic purposes, has resulted in universal consumer acceptance. Today, millions of us, consciously or unconsciously, are benefited by the hygienic effects afforded by the use of this soap. Other brands have followed along, and at present it is estimated that nearly 40% of all toilet bars sold in this country contain bacteriostatic additives.

As a result of the widespread public acceptance of the deodorant soap concept, the production of soap-active bacteriostatic chemicals is now measured in the millions of pounds annually, as contrasted with none in 1946. Hexachlorophene was, of course, the pioneer chemical in the field. Introduced to the trade in 1943, as a means of rendering soaps germicidal, hexachlorophene then (G-11)® evoked no interest until 1946 when it became the active ingredient in Dial soap. (1)

During the ensuing years, much research was carried out in this area. Techniques adequate to the evaluation of antibacterial and deodorant activity were developed. (2) Thorough investigations of all

toxicity aspects of such products were conducted in order to satisfy the safety requirements of the Federal Food and Drug Administration.

Bacteriostats other than hexachlorophene were employed in various brands of deodorant soaps. Among them, worthy of mention, were tetramethylthiuram disulfide and bithionol. More recently a significant contribution in the area of soap bacteriostats was made by the Monsanto Chemical Company with the introduction of the halogenated carbanilides, and the 3,4,4'-trichlorocarbanilide has been available, and widely sold, during the past several years. (3)

Research in our own laboratories has developed several synergistic combinations of bacteriostats which possess approximately twice the biological activity of either component alone. As examples, synergism has been found to exist between compounds from these indicated classes:

1. halogenated biphenols with alkylated halogenated biphenols
 2. halogenated biphenols with halogenated aromatic anilides
 3. halogenated biphenols with halogenated carbamides. (4) As a further research contribution in this area, we present the following original material comparing the antibacterial spectrum of hexachlorophene; 3,4,4'-trichlorocarbanilide; and a synergistic combination of the two at 1:1 ratio. The latter combination is designated as "1375" in the table.

TABLE I
A Comparative Antibacterial Spectrum of Hexachlorophene; 3, 4, 4'-Trichlorocarbanilide; and Synergist 1375.

Concentration of germicide necessary for complete inhibition of test organism. Application of germicides is from soap suspensions.

	ppm. germicide basis nutrient agar	Hexachlorophene	TCC*	1375**
Micrococcaceae				
S. aureus	0.2	0.2	0.1	
S. lutea	0.04	0.2	0.03	
Antibiotic-resistant Staph.				
388010	0.2	0.2	0.1	
388014	0.5	0.5	0.25	
388062	0.5	0.5	0.25	
388115	0.5	0.2	0.1	
388128	0.5	0.5	0.1	
Bacillaceae, Gram positive				
B. cereus	0.2	0.2	0.1	
B. megaterium	0.2	0.2	0.1	
B. subtilis var. niger	0.1	1.0	0.1	
B. subtilis var. aterrimus	0.2	0.5	0.1	
Lactobacillaceae				
S. faecalis	0.5	1.0	0.25	
Mycobacteriaceae				
1. M. phlei	0.2	0.2	0.1	
2. M. smegmatis	0.2	0.2	0.1	
Brevibacteriaceae				
B. ammoniagenes	0.1	0.5	0.1	
Enterobacteriaceae				
Gram negative				
1. E. coli	120	120	50	
2. S. oranienburg	100	120	40	
3. S. typhosa	200	180	90	
4. S. pullorum	80	80	40	
5. P. mirabilis	120	140	60	
6. P. vulgaris	160	160	80	
7. S. marcescens	60	60	40	
8. S. flexneri	100	100	50	
Pseudomonadaceae				
Pseudomonas fluorescens	180	200	90	
Neisseriaceae				
N. catarrhalis	0.2	0.5	0.1	
Fungi				
Candida albicans	100	80	40	
Trichophyton interdigitale	2	1	0.5	
S. cerevisiae	80	80	40	
Airborn mold	20	40	10	

*TCC—3,4,4'-trichlorocarbanilide

**1375—Patented synergistic compound of equal parts hexachlorophene and 3,4,4'-trichlorocarbanilide

Soap-synthetic systems

Neither hexachlorophene nor 3,4,4'-trichlorocarbanilide is particularly substantive to human skin. In large measure they are retained on the skin as a component of the soap film remaining after the washing procedure. These two chemicals are, therefore, not ideally suited to use in soap-synthetic systems, where the soap-filming properties are materially altered by the presence of the detergent. If they are used at all, the level must be much higher than in the case of soap alone. This is a rather expensive way out, but is nevertheless employed by some manufacturers.

A more practical approach is the utilization of skin-substantive bacteriostats. These have become commercially available during the past two years and one of them is at present employed in at least two brands of toilet bars. The most important of these chemicals are from the class of halogenated salicylanilides. Among them are 3,4',5-tribromosalicylanilide (containing some 4',5-dibromo derivative) (5), 3',4',5-trichlorosalicylanilide and 3,3',4',5-tetrachlorosalicylanilide. (6)

Much has been written concerning the approaching obsolescence of milled toilet soap as we have known it.

Notwithstanding these predictions, it may be said

that soap bars still constitute some 80% of the toilet bars sold, and they probably will not be supplanted in the foreseeable future. As a matter of fact, no strictly detergent bar has ever achieved a significant volume in the toilet bar field, although soap-synthetic bars have achieved some commercial success. Most of these include the deodorant feature, first incorporated in soap bars. Apparently, the recognizable superior hard-water performance of the soap-synthetic systems is not in itself enough to woo the consumer from the use of soap.

Synthetic detergents as soap additives

A number of different types of fat derived synthetic detergents have been used as additives to soap. It is interesting to note that all of these have one thing in common, a straight fatty chain as contrasted to a branched chain. Apparently, in order for these detergents to be compatible with soap, they must have the same long fatty tail as the soap molecule. Among various types of synthetic detergents used are the fatty alcohol sulfates, the fatty acid derivatives of methyl taurine, and the fatty acid esters of isethionic acid.

Recently, the alpha-sulfo fatty acids and esters also have been considered for this application. All of these detergents function in essentially the same manner in a soap bar. They act as lime soap dispersants, that is to say, they do not prevent the formation of calcium and magnesium soaps, but they disperse these precipitates in such a manner that they form neither a scum nor a "bathtub ring."

Significant research activity has been noted in the area of the synthesis of novel antibacterial agents for use in toilet bars. Looking ahead, it might be expected that a considerable variety of highly effective agents of this nature will be forthcoming, bringing about economical advantages as well as greater effectiveness. With regard to the latter goal, it would seem that there must be a practical limit to the degree of skin-degerming that can be accomplished through the use of the relatively non-toxic antibacterials required for use in toilet bars.

While soap-synthetic combination bars have achieved some success in recent years, it is not likely for many years to come that straight synthetic bars will become a factor in the market.

Acknowledgment

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Metallic Stearates

Insoluble Metallic Soaps

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THERE ARE THREE CLASSES of insoluble metallic soaps which are of importance industrially. The metallic stearate class is the most important and will be considered here. However, for general information, the other two classes are; the paint driers (naphthenates, tallates, linoleates, octoates) and the plastic stabilizers (cadmium-barium soaps of various short-chain acids).

The term "metallic stearate" is generic. These compounds are insoluble metallic salts of high molecular weight organic acids. These organic acids, termed "fatty acids", are derived from animal, vegetable and marine sources. A broad range of acids are available, varying in distribution of the different molecular weight fatty acid components. In general, the components range from C₁₂, (Lauric), up to C₂₂, (Behenic). Not only do the acids vary in chain-length composition, but they exhibit individual characteristics dependent upon the method of manufacture. In addition to the old pressing techniques, hydrogenation and solvent refining are customary processes used by the fatty acid manufacturer. It is clear that the metallic stearate manufacturer has available a broad range of fatty acid raw materials and when he refers to his product as "metallic stearates", it is a mere convenience.

The major metallic stearates, classified by metal type, are:

Zinc, Calcium, Aluminum, Magnesium.

Lithium, barium, lead, copper, and iron soaps are produced in some volume, but are much less important than the four major metal groups. Silver, strontium and other rare metallic stearates are produced in laboratory quantity against special orders.

Within each of the four major metal groups, a number of different grades are produced. It is not unusu-

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al for a specialist in the field to produce as many as twenty-five different grades of zinc stearate for different uses. The stearate producer can, by choice of fatty acid and by varying his precipitating techniques, control particle size, shape, bulk, odor, color, and a variety of chemical properties. Most metallic stearates are precipitated, although direct fusion is sometimes employed to produce coarse, low-quality grades. The precipitation process begins with the saponification of the fatty acids with caustic soda. The resulting soda-soap solution is brought into contact with a salt solution of the desired metal. The insoluble soap is precipitated, tank washed, recovered through filtration, washed again, dried, and ground.

The production of a broad range of metallic stearates as specialties of good uniformity appears deceptively simple. There are really many subtleties in the manufacture of these products. A detailed discussion of the effect of contact methods, temperatures, pH gradients, and other process variables is not in order here. Suffice to say that the operation is a combination of sound theory, empirical methods, and a healthy measure of pure "art".

Under the circumstances, finished product control techniques are of great importance. The typical stearate brochure will list the following properties as a typical analysis, or a specification:

Moisture %

Metal as Oxide %

Water Soluble Material %

Free Fatty Acid %

Apparent Bulk (fluid ounces per pound)

Melting Point (°C.)

Specific Gravity

This data, which is part of routine control, is not

sufficient for good control of a specialty stearate. It would be possible to show a practically identical typical analyses for four different zinc stearates designed for use in face powder, sanding sealer lacquer, masonry water paint, and rubber compounding. The result of this state of affairs is a very extensive use testing program to insure good control. This is not to indicate that it is necessary to make a face powder or to run a rubber extrusion to control the product. It is necessary to develop special test methods which relate to the problems involved. In some cases, however, such as sanding sealer lacquers, actual lacquers are prepared and checked before the zinc stearate is released.

Use of metallic stearates in toilet goods preparation

Most of the basic uses can be traced back to some aspect of the properties generalized below:

Metallic stearates are finely divided powders with excellent lubricating properties; have surfactant properties; are efficient water repellents; have varying colloidal properties in hydrocarbons.

The most important products employing metallic stearates are the many and sundry powder products. In general, zinc stearate is the most popular metallic soap for use in powders, although magnesium stearate does appear in certain products.

Several properties of zinc stearate dictate its usage in powders.

1. It is an excellent water repellent;
2. It has good lubricating characteristics;
3. It is an excellent acceptor of perfume compounds.

Although a good U.S.P. cosmetic grade of zinc stearate is generally acceptable for most powder applications, a specialist stearate producer offers several grades, varying in particle size and apparent density. As an example of the need for such variation, consider loose face powders vs. pressed cake face powders. In the case of loose face powders, a light, fluffy, fine particle sized zinc stearate is preferable.

When producing a pressed cake powder, the considerations are different. If there are oily components, the effect of lipophilic zinc stearate must be considered. Cake density and "rub-out" characteristics, as well as color extension, will vary, depending upon

GENERAL POWDER FORMULAE

	Face Powder	Baby Powder	Dusting Powder	Foot Powder
Zinc Stearate	7.0		5.0	5.0
Magnesium Stearate		5.0		
Zinc Oxide	12.0			10.0
Titanium Dioxide	5.0		5.0	
Talc	51.0	62.0	75.0	70.0
Colloidal Clay	11.0	21.0		
Magnesium Carbonate	3.0	7.0	10.0	8.0
Precipitated Chalk	11.0		5.0	
Boric Acid		5.0	Anti-fungal agent to suit	

the general formula and the nature of the zinc stearate. In most cases, some trial and error may be necessary to select the best grade of zinc stearate for a particular formula. Specific examples of four general powder product formulas are shown in the table. There are many variations possible, and perfumes and colors are added as desired.

The powder products account for the bulk of metallic stearates consumed by the toilet goods industry. However, metallic stearates have been included in a variety of other products. It is difficult to review this miscellaneous area because there is no other class of products in which the use of metallic stearates is truly general as in powder products.

In any event, when considering miscellaneous applications, zinc stearate is still the most popular item. It has been used in a variety of cream type products, including:

Deodorant Creams

Hand Creams

Shaving Creams

It is probable that the primary purpose for including zinc stearate is the beneficial dermatological effect that might be expected from residual zinc stearate on the skin. Secondary considerations would be control of cream texture and a measure of increased stability, due to the surfactant properties of the zinc stearate. Zinc stearate is also used in certain pharmaceutical ointments and creams for much the same purpose. Finally, zinc stearate has been included in certain detergent hand bars, presumably to improve the apparent "feel" of the bar.

Magnesium stearate, which is widely used in the pharmaceutical industry, finds minor use in the toilet goods industry as an opacifier. It is quite probable that this interesting metallic soap has not been exploited sufficiently by the formulator. It has a rounder particle shape, as opposed to the plate shape of zinc stearate particles. Micron analysis would indicate magnesium stearate to be even finer in particle size than zinc stearate.

Aluminum stearate has been used from time to time to control viscosity in mineral oil base products. This, however, requires a cooking step in production, and the average cosmetic manufacturing facility is not engineered to handle this operation in a consistent manner. Facilities similar to those of a lubricating grease manufacturer would be necessary.

Lithium stearate has been investigated many times by the cosmetic formulator. Lithium stearate can be produced as an extremely fluffy, unctuous powder, having great lubricity. However, it must be borne in mind that lithium is an alkali metal and can be an irritant to hypersensitive skins. Caution is advised when formulating with lithium stearate.

Although the writer believes himself to be experienced in the field of metallic stearates as a whole, he must admit that the very nature of these products leads to unusual and out-of-the-way uses. Consequently, it is quite possible that various uses for metallic stearates in the toilet goods field have not been mentioned in this review. It is felt, however, that the most important usages have been covered.

Chemical Additives to Soap

By PAUL I. SMITH

ADDITIVES ARE ADDED to soap to effect improvements in one or more of the following properties:

1. To endow the soap with some sales promoting emollient properties.
2. To improve structure and homogeneity.
3. To improve efficiency in the presence of hardness salts.
4. To improve surface gloss; to diminish cracking and flaking and to maintain the physical strength of the soap on aging.
5. To assist the finished soap in its ability to retain the perfume.
6. To improve the light stability of soaps containing antiseptic agents.
7. To help in the dispersion of super-fattening agents, specialized cosmetic ingredients, anti-oxidants, deodorants and antiseptic agents.
8. To improve the behaviour of the soap during milling.

Generally speaking, chemical additives are used in relatively small percentages, while super-fattening or "blending" agents may be present in quite substantial amounts and are sometimes called bulk additives. It is presumed, when discussing additives, that one is dealing with a good quality soap base with a fatty

acid content well over 80%. The additives recommended in this article are not intended to make good gross deficiencies in soap manufacture.

Bulk additives to improve blandness of soap

To endow soap with emollient properties a number of chemical and naturally derived additives are used. Super-fattening agents include mixtures of unsaturated and saturated fatty alcohols, saturated mono- and primary fatty alcohols, C₁₂, C₁₄, C₁₆, C₁₈, C₂₀ and C₂₂. It is recommended for the best results, the saponification number of the super-fattening agent should be below 2, the acid number 0, iodine number below 1 and solidification point 40-45%. Percentage of these higher fatty alcohols may vary considerably, but there are recognized optimums for various alcohols, e.g., it is usually considered that the C₁₈ higher fatty alcohols may be used up to 30-34% of the weight of soap without detrimental effects. The lower molecular weight additives, such as C₁₂, should not exceed much above 5%.

Cetyl alcohol is probably the best known of the super-fattening agents as it is not only valuable as an emollient, but acts as a stabilizer for emulsions as well as an auxiliary emulsifier. At one time cetyl alcohol had an unpleasant odor, but high grade mate-

rial with a minimum purity of 98% is now available which is entirely free from this trouble. Cetyl alcohol improves the texture and appearance of the soap.

Another very valuable super-fattening agent is lanolin and its derivatives. It is interesting to note that whereas pure anhydrous lanolin is best used alongside carboxymethyl cellulose (which acts as an emulsifying or dispersing vehicle), from 2-5% of the Pharmaceutical grade of anhydrous lanolin with 1-2% C.M.C. will give good results. Where emollient properties are required without emulsifying properties then acetylated types of lanolin can be used. With these comparatively new additives the well-known emulsifying properties of anhydrous lanolin are no longer present. Other agents added to soap to give it emollient properties or blandness include fatty acid alkylamides, lecithin, glyceryl and glycol stearates, diglycol laurate, etc.

Lecithin for soap

Although some manufacturers do not think very highly of vegetable lecithin in soap on account of its tendency to cause discoloration in white soaps, the increasing popularity of colored soaps offers new opportunities for lecithin, particularly the more stable lecithin and lecithin derivatives. The lecithin preferably should be used in conjunction with pure anhydrous lanolin, or liquid lanolin. The latter is produced from lanolin by vacuum distillation of the liquid lanolin esters or by fractional solvent crystallization. The addition of 0.5-1.0% lecithin used alongside 1% lanolin and 2% glyceryl monostearate improves the general blandness and cosmetic value of the soap.

When considering the addition of a super-fattening agent to the soap it is also important to remember that this may form a vehicle for other types of special additives, e.g., fractions of oat flour may be added to lanolin or other emollients in proportions of 2-5% of the weight of soap to endow it with a new and specific sales appeal. It is difficult to obtain exact details of the kind of oat flour used for this purpose, but in general it can be taken that the most useful fraction, which will pass through a 70 mesh screen, has a high protein content (20-22%) and a low starch content.

Sulphur as an additive

Another additive which needs to be used alongside a super-fattening agent is sulphur in dermatological soaps. Most manufacturers prefer to use dimethyl diphenyl disulphide with a 25% active sulphur content and 5-7% can be happily combined with one of the higher fatty alcohols. Other forms of sulphur (notably organic sulphur oil, colloidal sulphur and specialized sulphur products, such as Thiogenol) are not generally used as soap additives, but organic sulphur oil and disulphide are, of course, used in various creams and lotions.

Claims are made for many products, both natural and synthetic, such as the natural gums, methyl and methylethyl cellulose and sodium carboxy-methylcellulose and bentonite. It is significant that in spite of the wealth of new man-made chemicals there is a growing interest in the natural gums as additives

able to improve structure and homogeneity. The advantages offered by these hydrophilic colloids can be summarized very briefly:

1. Easily dispensable and able to produce high viscosities at low concentrations.
2. Ability to develop their viscosity over a wide pH range.
3. Freedom from any irritating effect on the skin.
4. Ability to swell in cold water to give stable dispersions or solutions.

Generally speaking, the gum family can be divided into three broad categories:

1. those derived from the exudation or sap of trees, such as Arabic, Karaya, Tragacanth, Ghatti, Shiraz, Mes-quite, Angico and Talha
2. those extracted from seeds like locusts, guar, quince, psyllium
3. those obtained from seaweeds, agar, kelp, sodium alginate and Irish Moss.

Although it is convenient to group the natural vegetable colloids together as swelling agents, they do differ appreciably in their characteristics, e.g., guar gum (a relatively new entry in this field) is a polysaccharide and consists principally of a complex carbohydrate polymer of galactose and mannose. In view of its chemical composition it reacts characteristically as a carbohydrate having a natural affinity for some chemicals to form complexes. With borax, a carbohydrate borate complex is formed which greatly increases viscosity and might, in fact, cause quite serious and undesirable changes in the structure of the soap mix.

The disadvantages of the natural gums are mainly associated with their color, presence of impurities and variation in quality depending upon their origin. Gum arabic or gum acacia, can be secured from literally hundreds of species of the Acacia tree drawn from many territories on the African Continent, and differing sometimes quite appreciably in characteristics one from the other. Gum tragacanth also varies quite considerably in quality, according to the grade and source of supply.

Because of the differences in quality of the natural vegetable colloids, some soapers prefer the synthetic alternatives, such as the methyl and methylethyl cellulose and sodium carboxy-methylcellulose, all of which possess valuable swelling properties and are also able to induce efficient emulsification of both natural and mineral oils.

These synthetic products have, of course, the advantage of being extremely stable in the presence of electrolytes. One curious property of methyl cellulose is that it is incompatible with the alginates and it should not be used in soap containing them.

Turning now to an inorganic colloid, bentonite, this is certainly of great interest to the manufacturer because it is not only able to improve both the structure and homogeneity of soap, but also to improve detergent and absorptive properties due to the negative polarity of the bentonite molecule. It also

increases the softening power of the soap and diminishes the irritating effect of free alkali on the skin.

From extensive experiments carried out in France and Italy, it appears fairly certain that bentonite is not an inactive filler in soap, but an active ingredient able to improve both the quality and appearance of cake and bar soap. When considering the addition of bentonite to soap it is very important to ensure that the soap does not contain more than the average percentage of free alkali or salt. Bentonite is sensitive to ionizing compounds in water and although it is unaffected by small quantities it loses its colloidal properties in the presence of large amounts, e.g., free alkali amounting to 5-10% is liable to cause partial flocculation. It is important when bentonite is used, it is first made into an emulsion with water and added gradually, with constant stirring, to the hot soap. The bentonite thixotropic gel blends well with the soap, and percentages as low as 4% bentonite will effect a noticeable improvement in the quality of the soap. Higher percentages are not infrequently used to effect savings in fatty acid content, but this practice is not so easy to justify.

Recent research, particularly in Germany, has shown that very considerable improvement of soap can be effected by use of ethylene oxide condensation products. Dr. Hans E. Tschakert (*Manufacturing Chemist*—June, 1958) has shown that when 2-5% of a suitable ethylene oxide derivative is added to soap, particularly boiled and hot-stirred soaps, appreciable benefits are accrued in the form of improvements in structure and homogeneity, gloss and lathering in cold water. The additives of particular interest to the soaper include laurylamine ethoxylate, oleylamine ethoxylate, myristic acid monoethanolamide, lauric acid monoethanolamide, lauric acid diethanolamide, oleic acid diethanolamide and polyethylene oxide wax.

Additives designed to improve efficiency in the presence of hardness salts

To improve efficiency in the presence of hardness salts is one of the aims of the soaper and in his review of additives likely to effect improvements the following questions will require an answer.

1. Will the additive be effective in use in the presence of other constituents in the soap?
2. Will the additive adversely affect the lathering property of the soap?
3. Will the additive have any injurious effect on any aromatic chemical which may be present, such as alpha amyl cinnamic aldehyde, hydroxy-citronellal; the macrocyclic musks and the new aldehydes, like lilial; or on coloring agents; antiseptics such as hexachlorophene; antioxidants and super-fatting or emollient additives. When sulphur is present in the soap, extra care needs to be taken to ensure that the additive does not react unfavorably with this chemical?
4. Will the additive have any undesirable physiological effect on the skin? It is, of course, well known that irritation to the skin is most often caused by excessive quantities of free alkali present in the soap, and there is also sufficient evidence for the

manufacturer to suspect that certain fatty acids tend to encourage unfavorable dermatological effects—caproic, caprylic and capric acids (which are present in coconut and palm kernel oils) have been named as potentially unreliable.

Some of the newer chemicals, such as guanidine stearate, guanidine laurate or myristate have been recently recommended for maintaining calcium and magnesium soaps in a dispersed state and thus reducing the amount of scum formed when washing in hard water. The stearate is said to be the most effective. Moreover, it is readily compatible with the so-called specialist chemicals likely to be present in cake and other soaps.

Detergents improve stability

Experience in Germany and also the U.S.A. has shown that by incorporating various synthetic detergents in the soap, it is possible to improve the stability of the soap solution towards the hardness formers in water. In particular, oleylamine ethoxylate and myristic acid monoethanolamide are of special interest for this purpose. The fatty alcohol ethylene oxide condensation product shows a marked ability to improve the stability of the soap in hard water without sacrificing lathering property and also contributes towards an all-round improvement in the detergent properties of the soap solution. Both these additives, and others in the same chemical family, are readily compatible with other ingredients of the soap. They can also contribute a great deal by helping to retard both spottiness and yellowing of cake and bar soap during storage.

It is interesting to note that when considering the use of both phosphates and silicates in soap, the more soluble phosphates are more compatible with silicates. Higher silicate to alkali ratios in silicates increases compatibility. Generally speaking, it can be said that silicates and phosphates with unlike cations are more compatible than those of like ions.

Sequestering agents, such as compounds like tetrasodium or tetra-potassium pyrophosphate and sodium hexametaphosphate, are frequently used in shampoos and other types of specialist soap to inhibit the precipitation of calcium and magnesium soaps in hard water. It is, of course, essential that these should not be thrown out of solution, or their efficiency impaired in any way by other additives present in the soap. The sodium salts of the polyamino acids, generally referred to as "chelating agents", are now finding their way into soap for a dual purpose:

1. To prevent hard water from interfering with soap activity.
2. To reduce and even prevent the clouding of soap solutions due to hard water soaps or precipitation of insoluble soaps in the detergent solution.

The advantage of these chelating agents is that as little as 0.025% is able to effect an appreciable improvement in the behaviour of the soap in hard water.

These may appear to be somewhat intangible benefits to seek but they are, nevertheless, extremely

important from a sales appeal aspect. Strong claims are made for many additives said to give soap cakes a more satisfying lather and to improve their keeping properties, both in use and on the shelf.

The alkyl phenol ethoxylates improve the appearance of the soap, that is, effect a noticeable and more attractive improvement in color and gloss. It is not known for certain how they affect the life of the perfume under generally unfavorable conditions of storage. The alkyl ethoxylates and the alkylamine ethoxylates tend to prevent premature drying out of the soap and the appearance of cracks and defects in the surface. They are more effective than moisture absorbants and humectants which are sometimes added to soap for this purpose. Some soapers are known to advocate the use of ethanolamines for this purpose, and it is claimed that, in addition, they are excellent suds boosters and dispersing agents. Triethanolamine and monoethanolamine fatty acid esters are named for this use.

Additives to improve perfume retaining capacity of finished soap

As the modern soap cake depends to a large extent on its alluring perfume, luxurious feel and generous lather, it is of vital importance that the soap should, throughout its life, be able to retain a high proportion of the expensive aromatic chemicals present. This presents serious problems, because some of the additives added to the soap to endow it with a specific property may, after a period of time, cause undesirable chemical changes in the perfume ingredients.

One of the safest and most effective retaining agents is polyethylene oxide wax, which is a bland synthetic product that is not only able to act as a satisfactory vehicle for the aromatic, but also holds it under the difficult conditions of soap usage. Also, the polyethylene wax improves resistance of the soap to rancidity changes which are known to have a most serious effect on perfumes. In soap manufacture, compatibility is of greatest importance. The polyethylene waxes are becoming very well known because they mix well with all other additives. All low molecular weight polyethylene waxes have exceptional resistance to the action of acids, alkalies and aqueous salt solutions. They are insoluble in water.

It has been claimed that the presence of so-called stabilizers in soap (such as diphenyl guanidine, monophenyl guanidine, and N-phenyl-N-cyclohexylthiourea and N-phenyl-N-cyananothiourea) help materially in retaining the soap perfume during storage or use. The same argument is put forward for antioxidants like ortho-tolyl biguanide, which even in quantities less than 0.1% will keep in check any undesirable rancidity changes liable to cause deterioration in odor and so adversely affect the perfume.

It is, of course, vitally important that the soap base should not be allowed to deteriorate through oxidation changes which in themselves destroy or reduce the fragrance of the perfume. The perfume retaining property of any good soap base, although it may be protected by the presence of additives, is to a large extent dependent on the ability of the odorous constituents present to resist the saponifying action of

the soap. Some of these constituents, notably the esters (cedryl acetate, isobornyl acetate, and terpinyl acetate) have, what might be termed, a protective action on soap.

Additives to improve light stability of soaps containing antiseptics

The growing importance of germicidal, deodorant and other specialized soaps, has thrown into sharp relief the tendency of some antiseptic agents to cause premature discoloration or spottiness of soap during aging. To counter this, some manufacturers are investigating the use of appropriate ultra-violet absorbers, preferably with a mild reducing agent. Such absorbers will improve the light stability of soaps containing antiseptics, of the type of 2,2'-thiobis (p-chlorophenol). For many toilet soaps alkyl phenol ethoxylate is a very useful additive that is not only compatible with most antiseptic bodies, but protects the soap base from discoloration during storage. Where stabilizers are added to soap to prevent or reduce auto-oxidation, a much smaller percentage is usually required for palm and coconut types of soap than any others. These are much less liable to develop off-color or odor.

Additives to help dispersion of bulk additives in soap

When considering the addition of any bulk additive to the soap, the manufacturer has to develop an efficient process of blending so as to obtain a homogeneous mix. Even the most efficient mechanical means available to the industry today are not always sufficient to give the highest dispersions. Therefore, use has to be made of specialized chemical additives. There are a number of such additives available and recently consideration has been given to the condensation products of polyalkylene oxide waxes.

For several years now, particularly in the West German soap industry, use has been made of oleic acid diethanolamide and in proportions not exceeding 0.5%. Because of this additive a very worthwhile improvement in dispersing power has been recorded. In British Patent 830,238 mention is made of new additives, notably sodium formate, sodium acetate, sodium lactate and sodium caprylate. Of these, the lactate is claimed to be the most promising.

Additives to improve behaviors of soap during milling

The soap manufacturer, anxious to increase the overall efficiency of his plant, is naturally interested in those additives which are able to bring about improvements in processing efficiency. Addition of up to 3% oleylamine ethoxylate has been shown to improve the behavior of the soap during milling without adversely affecting hardness and physical strength of the finished soap. Up to 1% pure anhydrous lanolin acts as an improver of general milling properties. As little as 0.75-1.25% of a 5% aqueous solution of carboxymethyl cellulose will lead to an improvement in the behavior of the soap during milling and also permit smoother extrusion. Dr. K. L. Weber (Seifen-Ole-Fette-Wachse 1957 Nos. 5-7) claims that CMC also imparts greater brilliance and smoothness to bar soap.

Fatty Acids Versus Natural Fats as Cosmetic Soap Bases

by H. A. MOLTENI

Manager, Pharmaceutical & Cosmetic Dept.
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E. F. Drew & Co., Inc.

In 1935, **H. A. Molteni** was graduated from St. Peter's College with a BS degree in organic chemistry. He took his graduate work at Fordham University, and in 1937 joined the research division of Corn Products Refining Company. Seven years later he became group leader in charge of applications research at E. F. Drew & Co., Inc., Palmo, N. Y., and then technical director of the fatty acid division. He joined the Onyx Chemical Corporation in 1955 as plant manager, and three years later returned to the Drew company as manager of the pharmaceutical and cosmetic department of the industrial sales division. Molteni is a member of the American Chemical Society, American Oil Chemists Society, and the Society of Cosmetic Chemists.



IN SPITE OF THE GREAT inroads that have been made by synthetic products in their replacement of soap as a detergent or emulsifier, there is still a relatively large number of popular cosmetic items on the market that employ soap as either the basic detergent or as the emulsifying base for the system.

Some of the outstanding properties of the synthetics, such as their resistance to hard water, their great tolerance for added electrolytes, and their ability to perform satisfactorily in neutral or acid systems, are important considerations when formulating a shampoo or a foaming bath oil. However, these properties are of little or no concern when formulating shaving soaps, cleansing creams, and a variety of lotions that rely on their topical properties for acceptance rather than on their ability to resist hard water, electrolytes, or acid media. In this latter type of product, soap has been, and will probably continue to be, the preferred emulsifier or detergent. Other additives may be employed to improve emolliency, lubricity, viscosity, or overall detergency, but soap still remains as the simplest and most economical base for such a product.

In formulating cosmetic products that employ soap as the emulsifying base, the soap may either be formed *in situ* by the saponification of a glyceride oil, or it may be formed by simple neutralization of a fatty acid mixture with the proper alkaline base. The question now arises as to which of these two soap forming sources is best suited as a raw material for the formulation of these soap-based cosmetic products.

We are all familiar with the efforts made during the last decade by the basic fatty acid producers to convert the major soap manufacturers from their age-old soap boiling artisanship to the simple neutralization process that is possible when employing selected fatty acid fractions. We are probably also familiar

with the fact that this ambition was never realized because the market price differential between natural fats and separated fatty acids, as well as the very important glycerine recovery factor, would never allow the use of fatty acids in the manufacture of such a highly competitive item as a bar of soap. The only inroad that was successfully made in this direction was the incorporation of small percentages of specially selected fatty acid fractions to improve specific properties of premium grades of toilet soap.

Cost differential is small

Although the economic factor is all important in favoring the use of natural fats over fatty acids for the production of toilet soaps, it is of little importance in the case of soap-based cosmetic products. The amount of soap used in most of these formulations is a small proportion of the complete formula and the small differential in the cost factor becomes negligible. Since the cost factor is a relatively unimportant consideration in our comparison of the relative merits of natural fats versus fatty acids for the manufacture of soap based cosmetics, there are some other factors which may influence our decision one way or the other.

The major producers of fatty acids have long been extolling the beneficial features of their products as tailor made building blocks for specialty soaps and not without good reason. Modern processing equipment, advanced manufacturing techniques, and newly developed analytical tools have combined to advance the fatty acid industry. It is now in a position to offer products of higher purity, finer quality, and greater stability than was ever heretofore possible.

Fractional separation of fatty components

The ability of this industry to separate the individual fatty components of natural fats and oils by various fractional separation methods is by far the greatest argument favoring use of fatty acids, rather than natural fats, in the manufacture of soaps for ingredients in formulated cosmetic products.

When using natural fats and oils, the formulator has no choice of fatty component other than that which may be accomplished by the blending of oils. For example, should he desire a pure oleate soap, he must be satisfied with the total fatty component mixture present in olive, teaseed, peanut, or corn oils. Consequently, the soap thus formed will consist of only 50-80% oleate soap, the remainder being a varying mixture of linoleate, palmitate, and stearate soaps. Should he choose to employ a fractionally crystallized and distilled oleic acid as the soap-producing base, the soap thus formed would contain upwards of 95% of the pure oleate derivative.

The same argument is true in the case where soaps of saturated fatty components are desired. Here the natural fat base could be hydrogenated animal tallow or a hydrogenated vegetable triglyceride such as cottonseed, peanut, or soybean oil. Again, the composition of the component saturated fatty acids would vary depending on the choice and blend of the base oils. In no case could a pure stearic or palmitic soap be obtained. Employing a fractionally distilled palmitic or stearic acid of 95% minimum purity, however,

allows the formulator to produce a high purity palmitate or a high purity stearate soap as well as the soap of the specific blend of these two fatty acids that best suits his requirements.

When forming soaps *in situ* from the natural fats and oils, a saponification boiling process is required. An excess of alkaline saponification agent is normally used. The degree of saponification must be checked periodically by determination of Ester Value and by determination of free alkali until both values indicate complete saponification of the oil has been obtained. This soap boiling procedure is often very time consuming, especially when contrasted to the instantaneous neutralization that is accomplished with gentle warming when working with fatty acids as the soap forming base.

Check acid value

When working with fatty acids, the desired degree of excess alkali can be easily predetermined by first checking the Acid Value of the fatty acids, and then employing a calculated excess of alkaline base over and above the stoichiometric requirement.

In forming the soap solution, the required amount of molten fatty acids are added, with agitation, to a warm aqueous solution of the alkaline base. Complete neutralization is effected in just a few minutes, and the end point is easily discerned when a clear, homogeneous solution forms.

In normal practice, the water soluble formula ingredients of the cosmetic product are added to the aqueous alkaline phase and the fatty acids are blended with the oil soluble components. The soap is formed almost instantaneously when the two phases are mixed. This simple practice cannot always be followed when natural fats and oils are employed as the soap forming base for there may be times when certain ingredients in the formula are not heat stable, or they may be volatile and thereby lost during the soap boiling process. In these cases, the soap must be formed first and only after adjustment and partial cooling may the other ingredients be added.

Formulation technique simple

Simplicity of formulation technique is, therefore, another consideration that favors the use of fatty acids over natural fats. An important fact to remember is: fatty acids by nature are corrosive materials and special precautions must be taken when handling these products to avoid metallic contamination of the cosmetic product and to preserve and prolong the useful life of manufacturing equipment.

Fatty acids will corrode iron, carbon steel, nickel, copper, and brass. Contact of the free acids with these metals must be avoided. Bulk storage tanks, pumping facilities, and transfer lines and valves should be fabricated of materials that will resist the corrosive effect of fatty acids.

Glass, Type 316 stainless, and a number of the Hastelloy alloys are all well suited for fatty acid handling, but all of these are costly construction materials and represent a substantial investment in material handling equipment. However, since the fatty acid producer ships his wares in lined, corrosion resistant containers, many firms by-pass the need for

TABLE 1
Commercial Types of Fractionally Separated Fatty Acids
Composition Analyses

Type	Caprylic	Capric	Lauric	Myristic	Palmitic	Stearic	Oleic	Linoleic	Linolenic
Lauric Acid			2	95	3				
Myristic Acid			2	95	3				
Palmitic Acid				2	95	3			
Stearic Acid					7	92	1		
Oleic Acids					1	2	94	3	
Coconut Acids	10	7	50	15	7	4	6	1	
Stripped Coconut Acids	1	2	60	15	7	4	8	3	
Soya Acids				1	4	2	30	58	5
Linseed Acids					6	2	18	20	54
Corn Acids					12	4	40	43	1

bulk handling equipment by direct transfer of the fatty acids from the shipping container to the mixing kettle.

It should be mentioned here also that if the soap forming procedure follows an order of addition of ingredients whereby the kettle contents are always maintained on the alkaline side, the corrosive nature of the fatty acids will not be a factor and materials of construction other than those mentioned above may be used. Although it seems rather apparent that the neutral, inert character of natural fats and oils offers a distinct advantage over fatty acids from standpoints of corrosion and material handling, this advantage can be overcome by following the above procedures when formulating fatty acid soaps.

These are economies

However, even in those cases where costly installations of corrosion resistant equipment have been made so that fatty acids may be properly stored and handled, the simplicity of fatty acid soap preparations brings about substantial savings in steam and other utility expenses that are normally associated with soap boiling techniques. The economies thus realized will usually allow for a rapid write-off of the original expenditure.

It has been previously mentioned that the greatest argument in favor of the use of fatty acids rather than natural fats is the selection that they offer to the cosmetic formulator. Table 1 lists a typical array of the many types of distilled or fractionally crystallized fatty acid fractions that are being offered today by the leading fatty acid producers.

The most widely used process in this industry is the continuous, high vacuum, fractional distillation process which allows for the separation of the component fatty acids of a vegetable or animal oil into fractions with individual purities of 95% and higher. Other less costly distillates are also available which may represent either a straight distillate of the entire fatty components of a glyceride oil, or a stripped or selected fraction of the component fatty acids. In all cases, however, the producer closely controls the quality, uniformity, and composition of each fraction.

Before the advent of the gas chromatograph, uniformity was controlled by such analytical tools as acid value, titer, iodine value and ester value fol-

lowed by a distillation analysis of a composite batch sample with a suitable laboratory distillation column. The development of gas chromatography techniques for the determination of the composition of fatty acid distillates has been a real boon to the fatty acid producer, for with this instrument he can not only guarantee better uniformity in his products but can simplify and increase his production capacity as well. Spot samples from plant distillation units can be analyzed for composition in a matter of minutes whereas older distillation analysis techniques required hours. This analytical tool allows for frequent quality checks, and if necessary, corrections of temperature, vacuum, or flow can be quickly made without serious loss of production capacity.

Table 1 contains data on the fatty acid composition of the various fractions that are normally offered by the major fatty acid producers. Table 2 contains the physical constants of these same fractions and included in this Table is the range of Acid Values that are normally found in each.

The Acid Value figure is an important one for our present consideration since it represents the combining power of the fatty acid with the alkaline base that is to be employed in the formation of a soap. Acid Value is expressed as the number of milligrams of anhydrous potassium hydroxide that is required

TABLE 2
Commercial Types of
Fractionally Separated Fatty Acids
Physical Data

TYPE	ACID VALUE	IODINE VALUE	TITER °C.	AVERAGE MOL. WT.	GARDNER COLOR
Lauric Acid	278-282	0.5 Max.	41-43	200	1
Myristic Acid	244-249	0.5 Max.	48-52	224	1
Palmitic Acid	216-220	0.5 Max.	56-60	258	1
Stearic Acid	198-202	2.0 Max.	62-65	284	1
Oleic Acid	194-198	88-94	5-10	282	1
Coconut Acids	268-274	8-12	22-26	202	1
Stripped Coconut Acids	256-262	8-14	24-28	220	1
Soya Acids	198-204	135-140	22-24	282	1
Linseed Acids	198-204	180-190	18-22	278	1
Corn Acids	198-206	110-120	28-32	282	3

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to exactly neutralize 1,000 milligrams of the fatty acid.

For commercial operations, we may substitute pounds for milligrams so that a fatty acid with an Acid Value of 230 would require 230 pounds of anhydrous potassium hydroxide for each 1,000 pounds of fatty acid, or 23 pounds of anhydrous potassium hydroxide for each 100 pounds of fatty acid.

When employing an alkaline base other than potassium hydroxide as the neutralizing component, the conversion factor to determine the amount of base required is a simple factor of its combining power or equivalent weight in relation to that of potassium hydroxide. For example, the same fatty acid fraction with an acid number of 230 would require 40/56.1 of 230 pounds of anhydrous sodium hydroxide for each 1,000 pounds of fatty acid and 149.2/56.1 of 230 pounds of triethanolamine for each 1,000 pounds of fatty acid. Most fatty acid suppliers will also oblige by supplying the actual Acid Value for each lot of fatty acids delivered, thereby eliminating the need on the part of the formulator to determine this value.

Determining acid value

However, if the formulator prefers to determine this figure in his own laboratory, one word of caution should be mentioned here in reference to proper sampling techniques, especially when sampling fatty acid fractions with melting points above room temperature. The component fatty acids of a given distilled fatty acid fraction will have a tendency to fractionally crystallize in the container as it cools after filling. Consequently, if the drum is sampled from the top of the container rather than in a manner whereby a true cross-section of the contents is obtained, the Acid Value thus obtained may not be representative of the whole.

Assured samples important

The best method to insure that the sample taken is representative of the whole is to melt the contents in a suitable hot room facility, agitate the contents, and then sample. The additional time taken at this point to guarantee an accurate sample will often avoid inaccuracies and non-uniformity in the formulated product with subsequent rejections or total loss of an entire batch.

Summary

From the relative merits of natural fats versus fatty acids as soap forming bases for specialty cosmetic items the factors of selection and simplicity definitely favor the use of the latter. The cost factor that favors natural fats is diminished by a more rapid turnover of equipment time when simple neutralization rather than soap boiling is employed.

The deterring corrosive action of fatty acids can be avoided by proper handling techniques or by the installation of corrosion resistant material handling equipment which usually offers a quick return on the investment through utility savings and increased production capacity. Consideration of all the factors involved in selecting the raw material to be employed as a soap forming base in the batch manufacture of cosmetics definitely seems to swing the balance in favor of the use of fatty acids rather than natural fats.

Syndets Versus Soap

For Dry Cleaning

by A. DAVIDSOHN

IN RECENT YEARS the dry-cleaning industry has become a very important market for the detergent industry. Not only has there been a steady increase in the number and size of dry-cleaning establishments, but the dry-cleaning industry has also undergone considerable changes with regard to the technical status of equipment and processing.

In the same manner as the modern laundry industry, the dry-cleaning industry has used current developments in machinery and detergents to improve the efficiency of the dry-cleaning process.

The detergent chemist and manufacturer must keep in mind the special conditions in a dry-cleaning establishment for which he is to supply detergents. It is necessary to know, if the dry-cleaning system employed is based on filtration, distillation, or combinations of both. Furthermore, it is important to know which type of solvent is used.

Thus, it is important to give some basic facts of the dry-cleaning solvents. The following table gives the properties of the solvents used in dry-cleaning:

	Carbon-tetrachloride	Trichloro-ethylene	Perchloro-ethylene	Standard Solvent ASTM Specification
Specific gravity 20°	1.59	1.46	1.62	generally between 0.75 - 0.81 300 - 410° F
Boiling point or Boiling range	169.7° F	188.4° F	250.2°	
Latent heat of vaporization at boiling point	84.2 Btu/lb	103.0 Btu/lb	90.0 Btu/lb	ca. 110 - 120 Btu/lb
Allowable concentra- tion for 8 hour exposure	50 parts per million in air	200 ppm in air	200 ppm in air	500 ppm in air
Flash point	100° F (minimum) "Tag"

Stated in simplified terms, the modern dry-cleaning process is basically a kind of solvent extraction of garments. Water and dry-cleaning detergent are added to enhance the soil-removal efficiency of the process for solvent-insoluble dirt. Usually the solvent is regenerated by filtration and finally by redistillation.

Before going into details on the composition of various dry-cleaning detergents, we have to discuss the actual purpose of the dry-cleaning detergent. The solvent for dry-cleaning acts as a solvent for the material to be removed from the garment, i.e. the fatty

soil. It is not possible to draw a parallel with wet-laundering process, where the water does not act as an actual solvent, but as a carrier for solubilized, emulsified, or otherwise dispersed soil. Only a small fraction of the soil encountered during laundering is water-soluble. Still, the water in wet-laundering is the carrier for the total soil to be removed.

Oily soil and dirt is most difficult to remove during wet-laundering, and here the detergent has its most difficult task. In dry-cleaning this type of soil is most easily removed by the solvent. The dry-cleaning detergent takes over the task to disperse and remove the soil which is only dispersible in water. For this purpose a certain percentage of water must be dispersed, or better still solubilized, within the dry-cleaning solvent. From this it becomes clear that the dry-cleaning agent has the double task to disperse or solubilize water within the solvent, and to disperse the solvent-insoluble dirt within this small amount of water in the solvent.

It also becomes clear from the above that only a detergent which will fulfill this task without interfering with the process itself will come into consideration. Unfortunately, soap does not fulfill this task in the same manner as a properly compounded syndet. Especially where filtration is carried out during the regeneration of the solvent, soap tends to form a gel in presence of water. This gel tends to clog the filter. Furthermore, as soon as a gel has formed, it tends to settle within the solvent, or at least it will cease acting as a detergent and water dispersant. Furthermore, in the case of chlorinated solvents, traces of split-off acid will destroy the soap, making it inactive.

This sensitivity of soap against acids also occurs—to a smaller extent—within hydrocarbon solvents, where lower-molecular acids within the soil will cause this splitting. To overcome this disadvantage, one would have to adjust the pH constantly, and even then other difficulties occur because the action of the soap is very easily affected by an overstepping of pH in the alkaline direction.

This disadvantage is not encountered with syndets, and led to the replacement of detergents based on soap by those based on syndets especially in chlorinated solvents. However, soap still keeps its place as a spotting agent in combination with solvents. The sub-

ject of spotting agents will be discussed later on in this article.

The actual composition of dry-cleaning agents is based mostly on the syndet dissolved within a solvent, to make it easily and quickly soluble within the dry-cleaning solvent. Syndets used for dry-cleaning detergents comprise practically all three types of syndet, namely: anionic, non-ionic and cationic syndets. Combinations of anionic and non-ionic syndets, as well as combinations of non-ionic and cationic, are also used. However, anionic and cationic syndets should never be used together. This is, of course, self-evident, as those two types would counteract each other.

It is therefore important, too, that the dry-cleaner does not mix different types of dry-cleaning detergents into a kind of "private cocktail". Not only are anionic and cationic syndets incompatible, but also most dry-cleaning syndets are compounded in such a manner that, even in the case of detergents based on principally compatible syndets, their physical behaviour might be negatively affected by mixing several detergents together. This is not difficult to understand, considering the rather complicated physico-chemical structure of the detergent-within-the-solvent system, where solubilization, dispersion, and many other factors are easily upset by improper compounding of detergents.

It is also important to keep in mind which type of solvent is used. In case of chlorinated solvents, solubility of the dry-cleaning soap or detergent is easier accomplished, and also the solubilization of water within the solvent is much easier. This is not difficult to understand, taking into account the strong polar structure of the chlorinated hydrocarbon. On the other hand, petroleum solvents are practically non-polar, and it is thus much more difficult to prepare dry-cleaning detergents not only soluble in the solvent, but also able to solubilize water within the solvent.

To give some examples of different dry-cleaning detergents, we will start with some formulas for dry-cleaning soap. It was found that "coupling solvents" are well suited for this type of product. These "coupling solvents" serve the double purpose of making the product more easily soluble and also increasing its water solubilization power. Very good "coupling solvents" are methyl-cyclo-hexanol and pine oil, both characterized by an OH-group bound to a cyclic hydrocarbon.

Formula 1

40 parts oleic acid are dissolved in 40 parts methyl cyclo-hexanol. This mixture is brought to a pH of 7.5-8.2 with 20% ammonia solution.

Methyl cyclo-hexanol may be replaced partly or totally by pine oil. This formula is rather expensive. Of course, the product may be sold already diluted with Stoddard solvent.

This dry-cleaning soap is suitable for use in petroleum solvents.

If a dry-cleaning soap is to be used in chlorinated solvents, the following formula provides a workable basis: (if the chlorinated solvent is constantly checked for split off hydrochloric acid.)

Formula 2

40 parts oleic acid are dissolved in cyclo-hexanol. This mixture is brought to a pH of 7.5-8.2 with 20% ammonia solution.

Again, neutralization is carried out with 20% ammonia solution to bring the pH to a somewhat higher degree, namely 8.5. It is also possible to replace the ammonia solution by monoethanolamin (ca. 8-9 parts) Again, as in the case of Formula 1 for petroleum solvents, the product may be diluted with chlorinated hydrocarbon.

Once more it must be pointed out that soap-based dry-cleaning detergents are not so well suited, especially if a "charged" system is used, i.e. a high percentage of dry-cleaning detergents. There will be a tendency of filter clogging.

For use in chlorinated solvents, non-ionic syndets of the ethoxylated alkyl-phenol type have been used as such or prediluted with chlorinated solvents. However, these non-ionic syndets are generally not freely soluble (especially in percentages encountered in dry cleaning) in petroleum solvents. Some special types, however, are on the market which are soluble in petroleum solvents, and might thus be used in this type of dry-cleaning bath.

Generally there is a tendency to use compound syndets for dry-cleaning detergents. Especially for flammable petroleum solvents the presence of anionic soap or syndet helps to prevent dangerous static electricity.

Very effective are combinations of non-ionic syndets with alkyl-aryl-sulfonates neutralized with mixtures of alkyl-amines and ethanolamines. As starting material for this type of anionic syndet the modern SO_3 produced alkyl-benzene-sulfonic acid is particularly suitable. This type of sulfonic acid contains only traces of free uncombined sulfuric acid. (1) Neutralization is carried out *in situ* within the solvent (similar to the neutralization of oleic acid in formulas 1 and 2).

By adjusting the proportion of alkyl-amine and ethanolamine used to neutralize the alkyl-benzene-sulfonic acid, one can easily modify the hydrophobe or hydrophilic property of the final product. More alkyl-amine increases the hydrophobe properties, but on the other hand raises the solubility in petroleum solvents. More ethanolamine usually decreases the solubility in petroleum solvents, but improves the water solubilization power. Generally, for chlorinated solvents little or no alkyl-amines are used, whereas for petroleum solvents alkyl-amine is important. However, one should always try to use just enough alkyl-amine to have the product soluble in petroleum solvents, as the ethanolamine-neutralized alkyl-benzene-sulfonate is a better detergent.

In order to facilitate formulations on the basis of SO_3 -sulfonated alkyl-benzene, the figures for neutralizing AB-S with various alkyl-amines and ethanolamines are given, as follows:

To neutralize 100 parts AB-S (SO_3 -produced), use:

- 47 parts triethanolamine
- 34 parts diethanolamine
- 20 parts monoethanolamine
- 23.5 parts butyl-amine (n,-or iso,-)
- 19 parts propyl-amine (n,-or iso,-)

These are, of course, average figures. Small variations

depending on the AB-sulfonic acid and the purity of the amines have to be taken into account. The following basic formulas will make the principle of this type of dry-cleaning-detergent formulation clear:

Formula 3 (for use in petroleum solvents)

100 parts AB-sulfonic acid (SO₃-produced) are dissolved in
300 parts petroleum solvent.
6 parts of n-butyl-amine, and subsequently
24-25 parts diethanolamine are added.
pH adjusted to 7 either by DEA or AB-S.

Additions of non-ionic syndets are also possible. In this case a petroleum-soluble ethoxylated alkyl-phenol compound is recommended. (e.g. 20 parts of Triton-X-45).

Formula 4 (for use in chlorinated solvents)

100 parts of AB-sulfonic acid (SO₃-produced) are dissolved in
300 parts perchloroethylene.
34 parts diethanolamine are added, and the pH adjusted to 7.

In case additions of non-ionic syndets are wanted, the choice is much greater than in the case of dry-cleaning agents for petroleum solvents. Practically all types of ethoxylated alkyl-phenols or ethoxylated fatty alcohols are suitable for use in chlorinated solvents.

In both formulas, 3 and 4, a part of the solvent used may be replaced by pine oil, to give a deodorant effect.

Other components, such as the dialkylsuccinic ester sulfates (trade name "Aerosol") and the sorbitol-derived syndets (trade names "Spans" and "Tweens") are useful for dry-cleaning compounds.

The use of pine oil for compounding dry-cleaning agents was already mentioned as "coupling agent". However, the addition of pine oil will serve another useful purpose: it acts as a disinfectant and deodorant as well, a fact of particular importance for woolen garments.

It must also be mentioned that perfumes (of low volatility, i.e. with a high boiling point) are also useful components for dry-cleaning detergents. Very often garments tend to have a characteristic unpleasant odor after dry-cleaning. Of course, this can be prevented by very careful treatment of the solvent used. However, even perfumes serve a useful purpose within a dry-cleaning compound, giving the garment a fresh and pleasant note. Of course, such perfume must not be too strong, so as to overpower scent and perfumes used as cosmetics.

Such additions of disinfectant and perfume are, of course, not fully effective if the dry-cleaning agent containing them is rinsed out by a subsequent solvent rinsing. In this case, the deodorants etc. will have to be added to the rinsing solvent.

Now a new system of dry-cleaning agents might, to a certain extent, mean a come-back of the soap. The author has made some experiments, by which fatty acids, (e.g. oleic acid) either alone or in conjunction with syndets, are added to the dry-cleaning solvent. Neutralizing agents (e.g. ammonia, ethanolamines) are dissolved in the water to be added to the solvent.

By this method a kind of *in situ* soap formation is obtained within the dry-cleaning bath. Solubilization of water is made easier, and additional detergent effects are obtained.

Further, the new type of SO₃-produced AB-sulfonic acid (s.a.) can also be used. This type of AB-S, if used in small quantities, is practically non-corrosive within the solvent. As soon as the pH is adjusted to 8, the AB-sulfonic acid is neutralized; there is no danger of reverse hydrolyzation with AB-S, so that there will be no free un-neutralized AB-S left over. This system is still in a stage of research. However, it seems likely that interesting results will be obtained.

As for spotting agents, soap retains an important place for this type of product. Products based on saponification of fatty acids with ammonia seem to be well suited for spotting purposes. The reason is easy to understand: after its action has been done, the soap is split into fatty acids and the ammonia evaporates. Thus only the fatty acid remains, and is easily rinsed out with solvent. In most cases rinsing is not necessary, as the amount of fatty acid is so small that it does no harm. But even those traces of fatty acid can be eliminated by using tale as an absorptive agent. By replacing ammonia with morpholine, a more effective soap is obtained. In this case, too, the soap is split, and the morpholine evaporates, although somewhat slower than ammonia.

Formula 5

5 parts oleic acid are dissolved in
100 parts benzene, xylene, or methyl cyclo-hexanol.
To this solution
3 parts of 20% ammonia solution in
50 parts water
are added under stirring. A milky solvent emulsion is obtained, which is used undiluted on collars etc.

Formula 6

10 parts of oleic acid are dissolved in
70 parts high-aromatic solvent.
2.5 parts morpholine
are added under constant stirring. A clear solution is obtained, which forms an emulsion on dilution with water.
Use of this formula is the same as with Formula 5. If there is difficulty obtaining a clear solution, add small amounts of pine oil.

With chlorinated solvents, syndets are preferable because on prolonged storage traces of hydrochloric acid split off from the solvent and tend to destroy the soap. Formula 4 may also form a useful basis for a spotting fluid. In this case higher dilution with the chlorinated solvent is recommended.

Such spotting fluids may be used as they are, further diluted with solvent, or diluted with water to form an emulsion.

Very simple spotting compounds may also be produced by dissolving a non-ionic syndet—especially ethoxylated alkyl-phenols or fatty alcohols—in aromatic solvents. 10-15% syndet in the solvent will give very good emulsions on dilution with water.

1. A. Davidsohn, *Soap & Chemical Specialties* in print . . . (1961).
A. Davidsohn, *Seifen-Ole-Fette-Wachse*, 86, 853-857, (1960).

John R. Gilman, Jr. came to John H. Breck, Inc., Springfield, Mass. in 1947. He was appointed director of publicity two years later. The following year he was made assistant advertising manager, a post which he held for five years.

In 1955 Gilman was named director of new products. The following year, he was promoted to technical director and has headed this company activity ever since. The producer of hair preparations is well-known throughout the industry, due in part to Gilman's work.



Is there a place for SOAP in shampoos?

by JOHN R. GILMAN, JR.
Technical Director
John H. Breck, Inc.
Springfield, Mass.

THE USE OF SOAP to achieve body cleanliness is uniquely human and sociological progress is, even today, closely related to the increasing use of soap or soap products. The repeal of the soap tax in England in 1853 heralded the emergence of a middle class from a poverty characterized chiefly by dirty, unsanitary conditions. Today, the importance of cleanliness to a modern society is attested by the presence of large business organizations owing their existence to the fulfillment of this universal need.

Originally, hair shampoos were formulated entirely from soaps blended to meet the distinctive problems encountered in cleaning hair; later, additives were developed to improve the over-all cosmetic results.

In general, skillfully formulated soap shampoos were very satisfactory, especially in soft water; but in hard water areas the diminished cleaning action of the soap and the deposition of soap curds in the hair severely restricted the widespread use of soap shampoos.

Following the introduction of synthetic detergents the problem of the effectiveness of a shampoo in hard water was largely mitigated. Moreover, the large variety of synthetic detergents allowed new possibilities for shampoo formulations and a whole new era of shampoo technology was initiated.

Of the many preparations used to beautify hair, today shampoos rank first in sales, capturing over twice the annual dollar volume achieved by any other type of hair preparation. Only two other cosmetic preparations enjoy a larger dollar volume—dentifrices and toilet soaps. Undoubtedly, these three items are the largest selling beauty preparations because

their principal function is to clean . . . and cleaning is a basic requisite for beautification.

Although shampoos, at first, were primarily cleansing preparations, they were soon developed into basic cosmetic preparations for the hair. Today, leading shampoos not only clean hair, they leave hair soft, lustrous and manageable. Special shampoos are sold for dry hair, for oily hair, for normal hair, for dandruff, for tinted and bleached hair. There are also special non-stinging shampoos recommended for use in washing the hair of babies and children.

Looking ahead we can anticipate that this trend will continue. Thus the important consideration in the design of a modern shampoo formulation is to fulfill not only the special cleaning problem of hair, but to achieve an ever-increasing cosmetic advantage.

Although it is generally stated that most shampoos satisfactorily clean hair, a closer study of the problem of cleaning hair reveals that the process is enormously complicated and must be more rigorously defined. As an approach to this cleaning problem, it is important to identify the types of "soil" which accumulate in the hair and on the scalp.

A healthy head of hair (female) averages about 120,000 hairs which together with the scalp present a surface area to be cleaned of approximately 30,000 cm², about twice as great as the entire skin of the body.

Also, the fibrous structure and physical arrangement of hair causes it to act as a trap or net which readily accumulates dust and dirt from the environment. This trapping action is greatly accentuated by

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the retentive properties of the lipid layer covering the surface of individual hairs.

"Soil" in the hair also originates from the scalp, the appendages of the scalp and from the surface of the hair itself. The scalp, like other epithelial surfaces, continuously exfoliates, depositing keratin scales in quantities ranging from normal physiological amounts to pathologically excessive amounts as in severe dandruff. Unlike the situation elsewhere on the body, these scales are not released to the environment but remain enmeshed in the hair.

The secretions of the sebaceous and sweat glands of the scalp accumulate in the hair and at least some part of this accumulation must be periodically removed. The precise composition of the secretion of these glands is not known but it consists of oils, fats, waxes, proteins, amino acids, salts and possibly, particulate cellular debris. It is likely (but not certain) that this secretion serves a real purpose in maintaining the cosmetic appearance of the hair, in which case complete removal by a shampoo might be undesirable, whereas selective removal would be preferable.

The hair itself possesses a surface layer of rather delicate microscopic scales and it is likely that individual scales or fragments of scales are normally detached by abrasion and contribute to accumulated hair dirt.

The widespread use of many kinds of hair preparations by American women has created a new cleaning problem for shampoos. Some of these hair preparations may leave a residue that must be removed by the shampoo. Certain others, for example, hair

tints, must remain unaltered and undisturbed by the shampoo. Thus a shampoo must selectively remove only undesirable surface materials and allow preferred materials to remain in place.

This is certainly a unique and difficult assignment for a cleaning product!

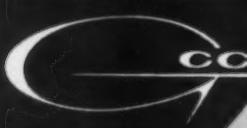
The cosmetic functions of a shampoo

In the present rapidly developing state of the cosmetic art, the concept of the optimal shampoo is changing continuously. This has come about mainly because it is now accepted that a shampoo is not simply a cleaning agent. Rather, a shampoo is the basis of a complex cosmetic treatment designed to contribute significantly to the health and beauty of hair. Certainly, the hair must be left "soft, lustrous and manageable" but it is now evident that a shampoo must offer much more. In fact, it is the effectiveness of a shampoo as a cosmetic that will ultimately determine its success.

Cosmetic aspects of shampoos

It is difficult to describe in technical language the various factors which may act together to make the hair beautiful. However, we can set out some basic criteria which may serve as a guide for the evaluation and development of a superior shampoo.

Health . . . Healthy hair is a prerequisite for beautiful hair and the regular use of a quality shampoo will certainly make a significant contribution to the health of the hair. It is essential that the shampoo remove cellular debris and degraded lipid and pro-



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tein material which may encourage bacterial growth.

As hair grows out from the scalp it loses all power of self-repair and in this respect is unlike most other surfaces of the body. During the "life-time" of a single hair it may be subjected to many minor damages which can ultimately seriously affect the distal end of the hair. Also, the sensitivity of the hair to damage is increased during the shampoo process because of the unavoidable swelling due to water which occurs at a time when the hair is being manipulated.

Lustre . . . Lustre is the visual result of a complex interplay of light on the hair. Light is reflected from the lipid layer covering the hair shaft and from the surface of the hair shaft itself. Variations in the thickness of the lipid layer produces optical interference effects which give rise to the desirable "sheen" of hair. Light is also refracted by the hair shaft since it is semi-transparent and also has a lens-like curvature.

Color . . . The color of hair is intensified and the attractiveness of the natural variation in color is emphasized when the dulling "dirt" film is removed by the shampoo.

Manageability . . . Manageability is one of the most important aspects of hair beautification. A shampoo must either selectively remove undesirable portions of the natural lipid layer or must replace this layer by a built-in conditioner. Additional factors such as entrapped degraded lipids and protein material under the margins of the scales on the surface of the hair undoubtedly affects hair softness, resiliency and flexibility. Excessive "drying" of hair by a shampoo may permit the accumulation of static charges causing the individual hairs to be mutually repellent. This so-called "fly-away" prevents satisfactory placement of the hair after shampooing.

Odor . . . Perfumes are usually blended into a shampoo formula but there is some question about the desirability in a shampoo if they are likely to persist in the hair. Clean, unperfumed hair itself has an attractive odor . . . and in any case, the individual may wish to make his own choice of perfume.

There are, of course, many other cosmetic considerations important in formulating a shampoo. The point to be emphasized here is that the detergents used cannot be selected only on the basis of properties such as lather, cleaning power, etc. A shampoo is a complex mixture of substances which must be blended in terms of their ability to work together to achieve an over-all integrated cosmetic result.

Soaps and synthetic detergents

The long and continuing controversy of "soap vs. syndet" has not succeeded in abolishing the use of either or a combination of both where the application, not the argument, was the deciding factor. Soap has been used throughout a large part of the history of man and consequently, has earned a secure place as a "safe" and inexpensive detergent. Also, soap is an excellent base for a shampoo and effectively cleans hair with a minimum possibility of damage. Possibly since soap is a "natural" product originating from animal and vegetable sources, it may possess undefined and unique properties which make it especially

suitable as a cleaning and cosmetic agent for human hair.

The most obvious initial advantage of syndets to the field of cosmetics was their effectiveness in hard water where an all-soap shampoo left a precipitate, difficult to rinse, especially from hair. Also, the large number and variety of syndets now available allows the cosmetic chemist greater flexibility in designing a shampoo.

In the near future it is not likely that soft water will become widely available in the United States. For this reason, among others therefore, an all-soap shampoo would not be completely satisfactory for nation-wide distribution. On the other hand, an all-syndet shampoo would fail to utilize the many advantages claimed for soap. Consequently, the cosmetic chemist has achieved the best performing shampoo by skillfully blending combinations of soaps and mixtures of syndets.

The choice of a particular soap and syndet blend is determined not only by the intrinsic detergent activity and cosmetic potential of these materials but also by the way they interact with additives incorporated in the shampoo to obtain specific cosmetic effects.

A shampoo must accomplish an unusually complex cleaning task and do so without damaging the sensitive structures of the hair, and scalp. It must also impart certain cosmetic qualities to the hair and it may be expected that each newly-developed shampoo will be superior in this respect.

Although much remains to be learned about the design of the ideal shampoo, it appears at the present time that soap will continue to find an important place in the formulation of a high quality shampoo.

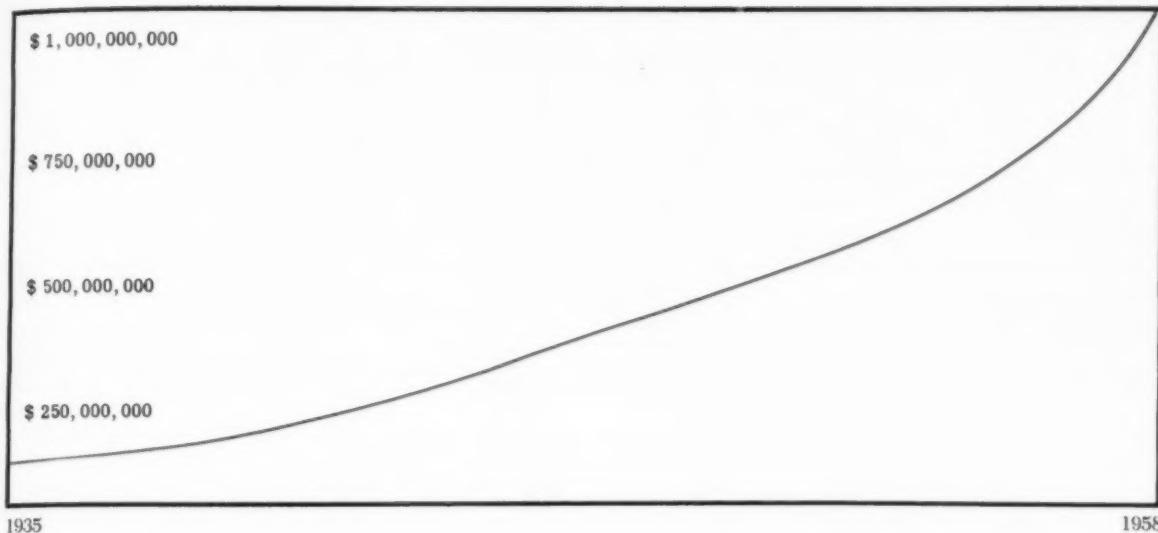
Some formulations, representative of the general categories referred to above, have been taken from the literature and are presented below:

Coconut Oil	14 ¹
Olive Oil	7
Caustic Potash 50° Bé	10
Water	69
Color & Perf.	q.s.
Emery Dist Coconut Fatty Acids	29.6 ²
Caustic Potash (100%)	7.9
Water & Perf.	62.5
Coconut Oil Fatty Acids	42 ³
Oleic Acid	56
Propylene Glycol	55
Triethanolamine	58
Water & Perfume	633
Coconut Oil Fatty Acids	42 ³
Oleic Acid	56
Propylene Glycol	55
Triethanolamine	58
Tergitol NPX	23
Water & Perfume	610

¹ The Chemistry and Manufacture of Cosmetics; D. Van Nostrand Company; Maison G. De Navarre; Pg. 418

² Fatty Acids and Liquid Soaps; Tech. Bulletin No. 21; Emery Industries, Inc.

³ Emulsions and Detergents—Ninth Edition; Union Carbide Corp.; Pg. 72



Toiletries Industry Growing at Increasing Pace . . . Up over 50% in Four Years

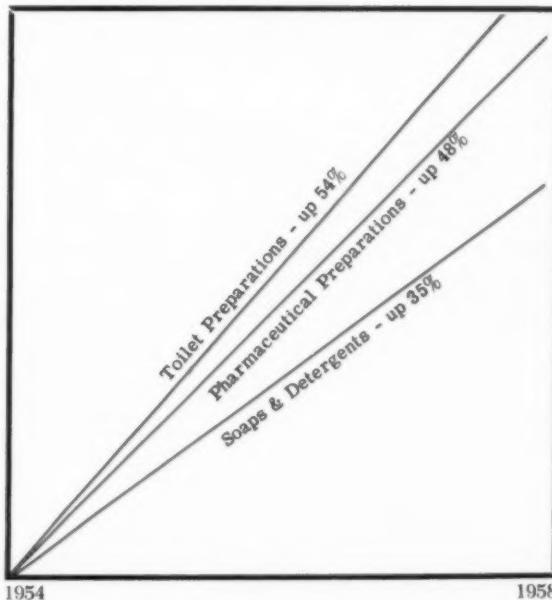
Final revised figures from the last census of manufacturers document the phenomenal increase the industry has experienced over the last few years.

Although the number of companies increased, the disproportionate increase of manufacturing establishments, particularly those of a larger size, indicates that the bulk of the increased business is accounted for by more branch plants and bigger companies rather than primarily through many new companies in the business.

An increase of all employees at a higher rate than production workers may indicate a higher proportion of technical staffs and probably sales staffs also.

Among the main classifications, the increases ranged from 35% for Shaving Preparations and Perfumes, Toilet Waters and Colognes, through 45% and 55% for Hair Preparations, Manicure Preparations, Creams and Deodorants, to 70% and over for Lotions, Powders, and Lip Preparations. Increases of over 100% were registered by Rouges and Bath Salts, Oils, and Bubble Baths. The largest increase, of course, was in Mascara and Eye Shadow which was up over 600%.

For the industry as a whole, New Jersey continues to be the state with the largest production followed by New York, Minnesota, Illinois and California. New York leads in the production of Perfumes, Toilet Waters and Colognes while Illinois produces the largest amount of Hair Preparations.



The bulk of the business is done by plants employing over 100 persons. The amount of sales per employee varies from \$20,000 or less for the smallest plants, to over \$45,000 for the largest plants. Sales per employee do not increase evenly by plant size, however, because of the effects of the companies with retail organizations and also, somewhat by the price ranges of the products.

All graphs cover period 1954-1958

After Shave Lotions up 42.5%
Brushless up 29.7%
Lather Cream up 17.2%

SHAVING PREPARATIONS UP 35.7% TO \$74,944,000

Soap Base, Lather cream	\$28,397,000
Non-Sap, Brushless	11,031,000
After Shave Lotions	27,836,000
Other	12,680,000

Mouthwashes up 255%
Toothpaste up 41.5%

Denture Cleaner up 16.2%

DENTIFRICES UP 51.2% TO \$197,833,000

Toothpaste	156,712,000
Mouthwashes	21,941,000
Denture Cleaner	6,257,000
Other	12,923,000

Suntan up 446%
Hand Lotions up 66.8%

Cosmetic Oils up 6.0%

LOTIONS UP 68.8% TO \$71,244,000

Suntan (including oils)	8,515,000
Cosmetic oils (including baby)	6,821,000
Hand Lotions	36,825,000
Other	19,083,000

Liquid up 73.5%

Cream down 18.0%

DEODORANTS UP 56.0% TO \$54,809,000

Liquid	23,332,000
Cream	15,165,000
Other	16,312,000

Lubricating Cream up 143%
Foundation Cream up 48.9%

Cleansing Cream up 48.5%

CREAMS UP 55.0% TO \$65,350,000

Cleansing Cream	24,221,000
Foundation Cream	6,829,000
Lubricating Cream	19,803,000
Other	14,497,000

Face up 67.8%
Talcum & Toilet up 60.3%
Liquid & Compact up 54.8%

POWDERS UP 75.4% TO \$97,610,000

Talcum and toilet powder	44,806,000
Face powder	22,139,000
Liquid & compact wet application	13,369,000
Other	17,296,000

Hair Dyes up 128%
Hair Dressings up 77.5%

Soap Shampoos up 32.8%
Detergent Shampoos up 18.7%

HAIR PREPARATIONS UP 43.2% TO \$315,795,000

Soap Shampoos	27,391,000
Detergent Shampoos	68,710,000
Hair Tonics	22,856,000
Home Wave Kits	43,692,000
Hair Dressing	36,104,000
Hair Dyes, Rinses, Tints	32,162,000
Wave Set Preparations	34,845,000
Other	50,035,000

Perfume oils up 78.3%
Perfumes up 36.2%

Toilet Waters & Colognes up 22.7%

LIP PREPARATIONS UP 87.4% TO \$44,432,000

MASCARA AND EYE SHADOW UP 610% TO \$10,235,000

ROUGES (NOT LIP) UP 129% TO \$4,709,000

MANICURING PREPARATIONS UP 42.2% TO \$18,521,000

BATH SALTS, BATH OILS & BUBBLE BATH UP 107% TO \$11,632,000

PERFUMES, TOILET WATER AND COLOGNES UP 34.3% TO \$103,449,000

Perfume oil mixtures and blends	24,572,000
Perfumes (liquid and solid)	17,854,000
Toilet water and cologne	58,048,000
Other	2,975,000

Geographical Distribution of Production

Entire Toilet Goods Industry

	No. of employees	Average plant size	% of National Production
New England	1,666	\$1,930,000	5.5%
Middle Atlantic			
New York	7,012	850,000	17.8
New Jersey	8,119	5,730,000	31.4
Pennsylvania	750	1,140,000	3.0
East North Central			
Ohio	1,327	2,620,000	5.9
Indiana	105	240,000	.3
Michigan	223	163,000	.3
Illinois	4,337	2,450,000	17.8
Wisconsin	202	870,000	.8
West North Central			
Missouri	655	309,000	.8
Minnesota	1,201	6,850,000	6.5
Other States	263	1,840,000	1.6
South Atlantic			
East South Central	696	390,000	1.5
West South Central	366	271,000	.7
Mountain	299	148,000	.5
Pacific	59	138,000	.1
California	2,151	580,000	5.4

Larger State Centers of Production

By Types of Products

Shaving Preparations

	Value of shipments	% of U. S.
New Jersey	\$40,291,000	53.5%
Illinois	8,532,000	11.4
New York	4,203,000	5.6
California	1,709,000	2.3

Perfumes, Toilet Water & Colognes

	Value of shipments	% of U. S.
New York	\$45,587,000	44.0%
New Jersey	32,275,000	31.2
Illinois	14,165,000	13.7
California	6,375,000	6.2

Hair Preparations

	Value of shipments	% of U. S.
Illinois	\$59,817,000	19.0%
New York	53,055,000	16.8
Minnesota	51,395,000	16.4
New Jersey	48,169,000	15.3
California	11,086,000	3.5
Pennsylvania	7,215,000	2.3

Other Cosmetics & Toilet Preparations

	Value of shipments	% of U. S.
New Jersey	\$152,097,000	36.8%
Illinois	66,912,000	16.2
New York	66,767,000	16.1
California	35,163,000	8.5
Connecticut	34,678,000	8.4
Pennsylvania	8,312,000	1.9

Profile of Industry by Plant Size

Plants employing	No. of employees	Value of shipments	Average shipments per plant	Average shipments per employee
under 5	729	\$ 12,577,000	\$ 32,800	\$ 17,300
5 - 9	713	14,449,000	134,000	20,300
10 - 19	1,009	20,721,000	276,000	20,500
20 - 49	2,407	50,283,000	653,000	20,900
50 - 99	2,767	87,138,000	2,230,000	31,500
100 - 249	5,538	173,453,000	5,100,000	31,300
250 - 499	7,249	324,800,000	16,250,000	44,800
500 - 999	5,375	245,016,000	30,600,000	45,600
over 1000	3,677	130,724,000	43,600,000	35,500
All Plants	29,464	1,059,161,000	1,420,000	36,000

Channels of Retail Distribution of Toiletries*

	Chain & Independent Drug Stores	Dept. & Specialty Stores	Food Stores	House to House	Ltd. Price Variety Stores	All Other Outlets
1959	26.8%	18.1%	22.9%	20.5%	8.4%	3.3%
1958	27.1	19.2	22.3	20.0	7.9	3.5
1957	28.6	20.6	20.3	19.7	7.3	3.5
1956	29.3	21.6	19.1	19.6	7.2	3.2
1955	29.4	22.3	17.9	20.0	7.3	3.1
1954	30.2	22.5	17.1	19.4	7.5	3.3
1953	32.0	22.1	15.5	18.3	8.4	3.7
1952	34.5	22.0	14.0	17.5	8.5	3.5
1951	36.0	25.5	8.5	16.2	10.0	3.8
1950	37.0	27.0	6.1	14.0	11.0	4.9

*From T.G.A. Bulletin #3354

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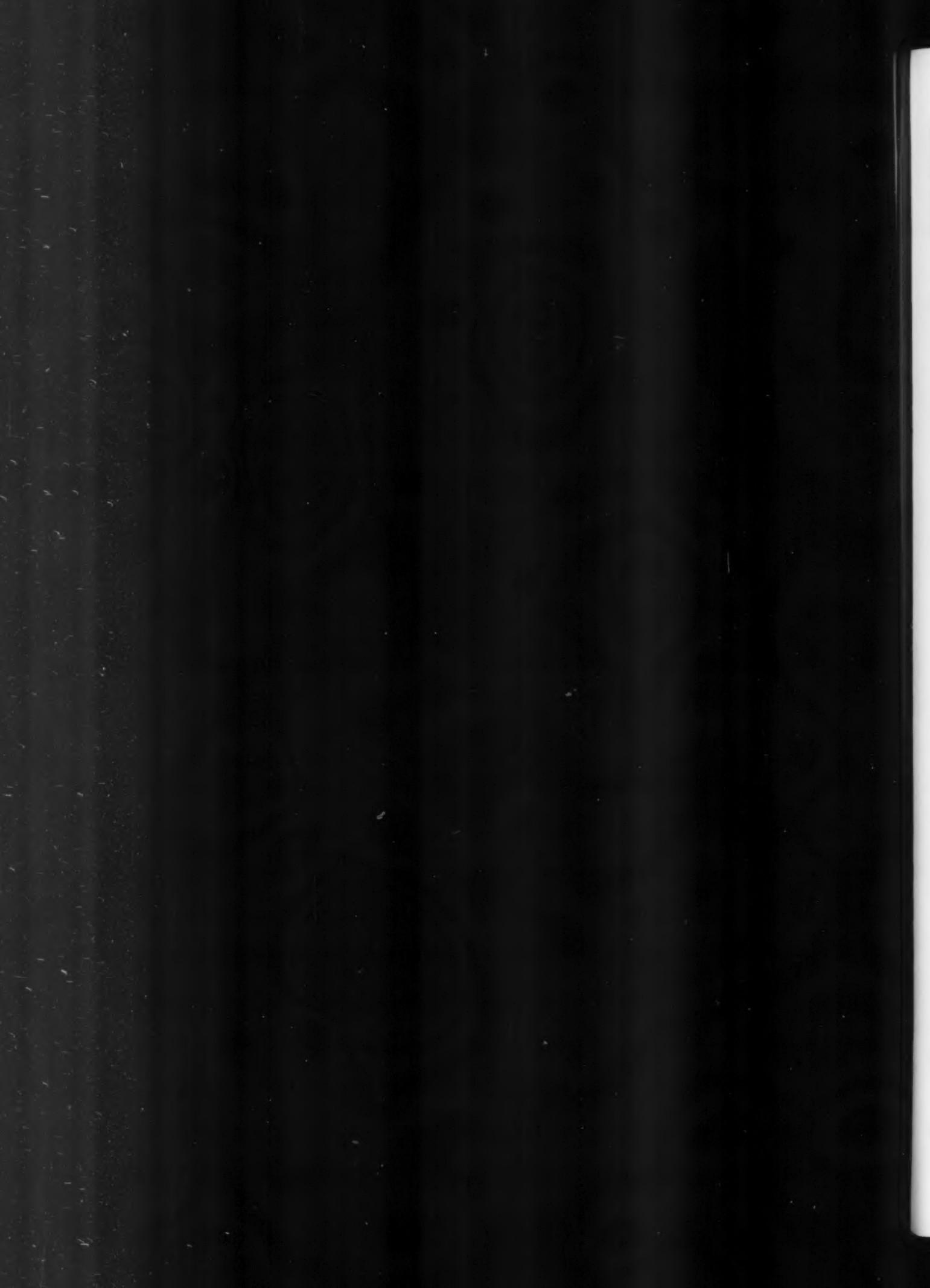
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COVER ODOR G No. 1954 (A)
COVER ODOR G.R. No. 27 (PE)
COVER ODOR J.W. No. 2404 (W)
NUTRALCO No. 350 (IN)
COVER ODOR O.B. No. 1714 (I)
COVER ODOR N-43 (I)
COVER ODOR N-4 (I) (PE)
COVER ODOR P. No. 1954 (S)
COVER ODOR P.C. No. 3127 (S)
COVER ODOR P.D. No. 250 (P)
COVER ODOR R.C. No. 604 (PE)
COVER ODOR SASS. No. 1954 (A)
COVER ODOR ST. No. 275 (P)
COVER ODOR W.A.S. No. 300 (W)
COVER ODOR W.P. No. 400 (W)
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Oil Jasmin No. 613
Oil Mimosa No. 615
Imitation Geranium S
Elan Tibet Savon No. 12

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Oil Mint No. 523
Oil Narcissus No. 614
Imitation Geranium
No. 24
Oil Fougere No. 300

SHAMPOO ODORS

Oil Bouquet Apple
Blossom No. 8240
Oil Bouquet Almond
No. 8262
Oil Clover No. 888
Oil Bouquet H.O.
No. 8267
Oil Bouquet M. No. 55
Oil Bouquet Narcissus
No. 55
Oil Bouquet Wild Rose
No. 55
Oil Bouquet TV No. 55

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Apple Blossom No. 3122
Oil Sweet Pea No. 3123
Oil Wistaria No. 3124
Oil Gardenia No. 3125
Oil Bouquet E.T. No. 3126

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News of the Societies of Cosmetic Chemists

Conley to address N. Y. Chapter Ladies Night Meeting

Annual Ladies Night for the New York chapter of SCC has been scheduled for April 12, and Dr. Veronica L. Conley will address the group.

Dr. Conley, who is director of the department of Nursing of the American Medical Association, will tell what nurses and doctors' wives think about cosmetic advertising.

Bradshaw tells New York chapter histochemistry has not kept pace

M. Bradshaw, research histochemist, New York City, told New York Society of Cosmetic Chemists recently that histochemistry has not kept pace with the other sciences in this field.

Sudan Black B, since its introduction, has been widely used for the histochemical demonstration of lipid. And according to Bradshaw, its superiority over other dyes has been amply demonstrated. When formalin-fixed frozen sections are placed in a solution of 70% alcohol saturated with Sudan Black B, the lipid is stained because it is able to extract the dye. The dye is more soluble in lipid than it is in the alcohol. If the dye could be brought through the living skin it should be absorbed by the lipids in the cell.

The study was supported by grants from N. I. Malmstrom & Co. and Malmstrom Chemical Corp.

SCC sets date, papers for semi-annual spring meeting

Members of the Society of Cosmetic Chemists will convene May 12 at Hotel Biltmore, New York City for their semi-annual spring meeting.

Program chairman Morris J. Root has set up papers covering the contribution of the chemical engineer, organic chemist, analytical chemist, pharmaceutical chemist, inorganic chemist, physical chemist, and biological chemist to the cosmetic industry. In addition to a paper on each of the foregoing, there will be one on the physical and chemical properties of shellac and its derivatives.

Walter Wynne, chairman of the arrangements committee is handling advance registrations. Address the Society at 2 East 63rd St., New York 21, N. Y.

Brown to tell Chicago chapter how to select and identify creative chemists

Dr. Alfred E. Brown, president and director of research, Harris Research Laboratories, Washington, D. C., will speak at the April 11 meeting.

Because of the current concern over the so-called lag in scientific creativity in this country, Dr. Brown's discussion of methods used to select and identify creative scientists (particularly chemists) promises to be thought-provoking and stimulating. Also Brown will tell ways research laboratories can induce research workers to achieve maximum potential.

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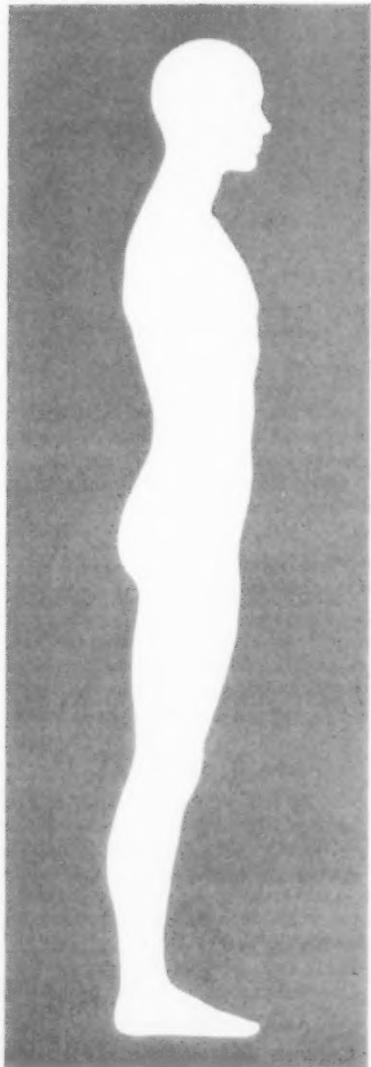
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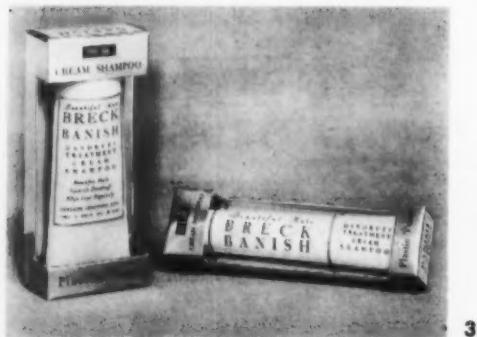
1—Christian Dior

A deluxe version of the "Miss Dior" spray is being merchandised in a slender, silver-plated cylinder. A companion product, a gift and refill spray, packed in a plasticized gray cylinder may be used by itself or for refilling the deluxe container. The deluxe spray retails for \$15.00 and the gift and refill spray is \$7.00. Both Eau de Toilette products were introduced March 1st through exclusive stores.



2—Houbigant

Chantilly, Quelques Fleurs and Flatterie fragrances are being packaged by Houbigant in one and one-half ounce pastel bottles in a colorful gift carton for Mother's Day selling. The spray Eau de Toilette Mist will retail for \$2.50 plus tax.



3—John H. Breck

John H. Breck is now offering its Banish Dandruff Treatment Shampoo in cream form in two and four ounce tubes. Banish has previously been available only in liquid form. The new package is a white opaque polyethylene tube printed in black and red, framed in a gold border. Both sizes are packed in open face, gold foil cartons which maintain good product visibility and allow horizontal stacking.

4—AR-EX Products

AR-EX Products Company has announced the addition of Moisture Lotion to its line of hypo-allergenic cosmetics. The dry skin moisturizer is reported safe for sensitive or allergic skins and effective for use on all skins. The two-ounce bottle is packaged in a clear acetate cylinder and two types, scented and unscented, each retail for \$2.50 plus tax.

5—Allen B. Wrisley

Complexion Treatment Soaps designed to overcome specific skin problems have been introduced by Allan B. Wrisley Com-



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pany. Three formulas, each containing lecithin, have been compounded to help dry, oily and sensitive skin. The soap is packaged three cakes to a box and a self-display carton holds five each of the dry and sensitive skin soaps and two boxes of the soap for oily skin. An individual box retails for \$1.50.

6—Shulton, Inc.

A self-service display carton is being used by Shulton, Inc. for its Old Spice Line. The navy-blue display holds 72 items packed in proportion to their rate of sales. Featured in the container are Old Spice After Shave Lotion, Stick Deodorant, Body Talcum and Pro-Electric. Artwork with the "Brisk as an ocean breeze" slogan and product illustrations tops the display piece.

7—Helene Curtis

Lanolin Creme Shampoo is again being offered by Helene Curtis at a fifty cent reduction in price. This once-a-year promotion will be featured on a three-tier display unit holding one dozen jars of the shampoo which will carry red bands imprinted "Sale \$1.39—Save 50¢". The display carton will feature a striking pink stacking card headlining the 50¢ saving and showing a girl using the product.

8—Toni

June first is the date set for the debut of a Toni promotion which will include a booklet of fashions designed for Miss America of 1951, Nancy Anne Fleming, and an offer of a free McCall's pattern for any one of the eight outfits illustrated. A tie-in with the home permanent wave kit will be eight hairstyles worn by Miss America and setting instructions for each. All the hairstyles will be based on a Toni home permanent wave. Intensive network and spot TV together with print advertising will launch the promotion this spring.



7



8

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New Products

New laboratory furniture has drawer-cupboard storage

Two new units have been added to the Fisher line of laboratory furniture. Each has generous drawer and cupboard facilities, and blends with other components in the line, as standardized interchangeable direct-from-stock units.

Constructed of heavy-gauge steel (Bonderized,) the units are finished with four coats of chemical-resistant,



baked-on resin. Shelves adjust over a 20" range in $\frac{1}{2}$ " increments. Drawers have ball-bearing rollers inside the channels, and are equipped with safety catches.

Available in 3' and 4' wide models, and in either stainless-steel, Formica, or Kemrock top, the units are 36" high x 22" deep.

The smaller model has a 32" drawer under the working top, for burets, condensers, etc.; three smaller drawers 15" wide. The cupboard is 15" x 21" x 21".

The other model has two 2" drawers just below the working level; four 5" x 21" drawers on the left side; and 21" x 21" cupboard. Fisher Scientific Co.

Sonic homogenizer works fast, disassembles quick

Clean-up time has been reduced on "quick-strip" sonic homogenizer, emulsifier. The machine offers easy access to every part in contact with the liquid, and can be taken apart, or



put together, in about five minutes.

The unit will handle any viscosity of liquid, from water to semi-paste. It uses the force of the fluids to produce the sound waves.

The unit, indicated as Rapisonic Mark V, is mounted on a portable base, and is available in variety of sizes ranging from pilot-plant model with 2 to 4 gpm capacity to 15-20 gpm capacity. Each is equipped with 220/440, 60 cycle, 3-phase, enclosed explosion-proof motor, V-belt drive and non-sparking casters. Sonic Engineering Corporation.

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This book was written to fill a real need for an adequate, systematic, and up-to-date coverage—and to serve as a bridge between the general organic chemistry textbooks and highly advanced reference works. Particular stress is laid on the reactions involved in degradation and synthesis, chemical transformations, and some of the more recent developments in stereochemistry and biosynthesis. Verbiage has been reduced by the use of flow sheets for many degradations and syntheses. Mono-, sesqui-, and diterpenes are treated in somewhat more detail than the more complex terpenes, although the more important aspects of these last are included.

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- co-solvent and plasticizer for aerosol hair sprays and make-up
- lubricant and compressing aid for talc and powders
- non-volatile solvent for many antiseptics and for sebum in acne preparations
- forms persistent films for sunscreens
- for hypo-allergenic cosmetics and specialties

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TECHNICAL ABSTRACTS

Brit. Patent No. 838,913: Aerosol Shave Cream Packages —based on low soap concs. relatively free from usual triethanolamine soaps. Colgate-Palmolive Co. 18.11.57 as 35887/57, clg. 28.11.56 (Germ.).

An aerosol shave cream package comprises a valve controlled pressure-tight container containing a liquefied propellant gas and a shave cream. This cream comprises an aqueous soap solution with a total content of less than 4% by weight of alkali metal, ammonium or alkylamine soaps, or soaps of primary or secondary alkanolamines, the content of triethanolamine soaps (if present) being in minor proportion based on the total soap content. Low soap concentrations are more favourable for softening the hair than the high concentrations usually employed, a soap concentration between 1% and 3% appearing to be the most favourable. Alkali metal soaps are especially effective at low concentrations, which is

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not the case with triethanolamine soaps. This may be attributed to the stronger tendency of triethanolamine soaps to micelle aggregation as well as particularly to their greater molecular diameter and the greater diameter of their cation, rendering the penetration of the triethanolamine soaps through the cuticula more difficult. Mono- and diethanolamine soaps on the other hand again show a dependence of the cutting resistance on the concentration of the soap solution, even though to a lower extent. A similar dependence exists for alkylamine soaps. For obtaining a good gliding of the blade, and for stability of the lather, suitably 0.5%-3% of a potassium, ammonium or alkanolamine polyacrylate are employed, the molecular weight of polyacrylic acid being preferably between 100,000 and 200,000. *Thru Derwent Organic Patents Bull.*, 196, Gp. 5, p. 9 (1960).

Hair Treating Preparations. Brit. 824,429. 2.12. 1959. Maryland Devices, Inc. U.S.A.

Refers to hair treating preparations containing a keratin-reducing agent which has been found useful in the waving or depilation of hair. It includes a package containing a keratin-reducing agent which has been found useful in the waving or depilation of hair. It includes a package containing a keratin-reducing agent under the pressure of an inert gas, from which package the prepa-

ration can be expelled in a cream-like consistency utilizing the inert gas as a propellant. Such preparations are claimed not to degrade through chemical reaction, not to develop any disagreeable odour, and the suggested package is convenient from the preparations, permitting them to be expelled therefrom at the desire of the user in a cream like consistency without foaming and free from gas bubbles. *Thru S.P.C.*, XXXIII, No. 7, p. 716.

Brit. Patent No. 840,399: Improved Shampoo Leaf—comprising high wet strength paper coated on one or both surfaces with a detergent comprising an ammonium salt of a sulphated fatty alcohol. County Labs. Ltd. 10.12.58 as 908/58, clg. 9.1.58 (Add. to 790,492 (GB).

An improved shampoo leaf comprises a sheet of paper of high wet strength carrying on one or both faces as a detergent, a surface coating of one or more ammonium salts of sulphated fatty alcohols having 10-18 C atoms in the molecule, the detergent adhering to the paper without flaking off and the shampoo leaf being such that it can be rubbed on a user's head without the paper disintegrating. The preferred detergent is the ammonium salt of the sulphated lauryl alcohol or the ammonium salt of the sulphuric acid esters of narrow cut alcohols derived from coconut or palm kernel oils. Patent Specn. 790,492 specifically describes non-sapona-



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ceous detergents which include water-sol. salts of sulphated fatty alcohols. *Thru Derwent Organic Patents Bull.*, 198, p. 5, p. 6 (1960).

British Patent No. 839,805: Sprayable Compositions—hair sprays. Monsanto Chemical Co. 10.6.58 as 18489/58, clg. 10.6.57 (USA).

Sprayable composition comprises a solution, in an anhydrous alkanol contng. 1-4 C atoms of an alkyl ester of a copolymer of maleic anhydride and an olefin contng. 2-4 C atoms, the copolymer having been esterified to the extent of 50-70% with an alkanol contng. 1-4 C atoms and, as a propellant therefor, a halogenated alkane having 1-3 C atoms in the molecule. Example: Dissolve 1.5 parts of an ethyl half ester of a copolymer of ethylene and maleic anhydride having a molecular weight of substantially 25,000 in 30 parts of anhydrous ethanol. Place the solution in a pressure container fitted with a spray nozzle and pressurise the soln. with 70 parts of a 50-50 mixture of dichlorofluoromethane and dichlorodifluoromethane. When sprayed on newly waved human hair, a thin transparent non-glossy film forms which holds the wave in place. The treated hair may be combed repeatedly without any evidence of flaking. On washing with warm water and soap or conventional shampoo preparations, the film dissolves quickly and completely. *Thru Derwent Organic Patents Bull.*, 197, Gp. 5, p. 15 (1960).

German Patent No. 1,083,503: Deodorant—containing as active ingredient a metal compounds of a 1:3-diketone. Vereinigte Papierwerke, Schickedanz & Co. 7.10.57 as 30H.13/01 V132 24 B.E. pending 32008/58.

New deodorant contains as active ingredient a com-

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- lotions and creams
- aerosols
- antiperspirants
- shaving preparations
- make-up
- shampoos
- rinses
- cold waves
- hair dyes
- other treatment preparations

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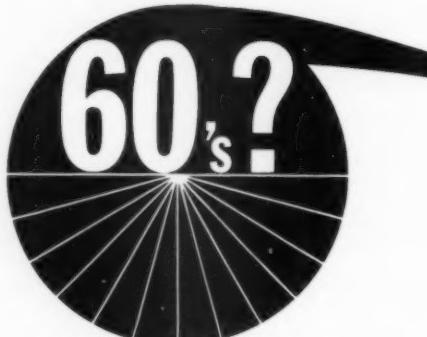
ound of a metal, preferably polyvalent, with a 1:3-diketone. It may be used in bandages, etc. by treating the fibres or fibrous materials with the active compound, e.g. by impregnating, spraying, etc., and may also be used in creams, powders, liquids and soaps. Suitable metals are Cu, Ni, Co, Ca, Zr, Sn, Al, Cd, Ce, Be, Mg and Hg and the diketone an acetylacetone which may be substituted by optionally substituted alkyl, aryl or acyl groups. Typical compound is heptanedione zirconate obtained from heptane dione and zirconium acetate. *Thru Derwent Organic Patents Bull.*, 197, Gp. 5, p. 6 (1960).

Brit. Patent No. 840,366: New Soap Germicide—comprises 3:4:5'-tribromosalicylanilide. Unilever Ltd. 3.12.58 as 38950/58, clg. (two appl.) 5.12.57 (USA).

It may be prepared by brominating salicylamide, pref. in aq. acetic acid medium contng. 25-75% by wt. of acetic acid and 75-25% of water, at 50-55°C. Alternatively the medium used may be water contng. an organic surface active agent, suitably 99.9-98% water and 0.1-2% of the surface active agent, bromination being effected at 50-65°C. Alkyl aryl sulphones, alkyl sulphates and aliphatic acyl aminoalkane sulphones are suitable surface active agents. Cationic and nonionic surface active agents may also be used. An example describes the preparation of a synthetic detergent bar contng. the germicide. Human skin washed with it exhibited a strong inhibitory effect against *Micrococcus pyogenus* var. *aureus*. *Thru Derwent Organic Patents Bull.*, 198, Gp. 5, p. 6 (1960).

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.. NEWS AND EVENTS ... NEWS AND

Lancome Sales to push "Magie" symbols

A sly snake and a bitten apple are the basis of Magie perfume advertising which is appearing currently in the *New Yorker*, *Town & Country*, *Vogue*, *Harper's Bazaar* and *Playbill*. The "Garden of Eden" symbols are intended to increase consumer awareness of Magie. Lancome Sales Inc., New York City, is offering, through the ad, a free gift bottle of the fragrance.

Angelique appoints new advertising agency

Angelique & Co., Inc., Wilton, Connecticut, has appointed Wilson, Haight & Welch, Inc., Hartford, Connecticut, to handle advertising and sales promotion of their line of perfume and cosmetic products. Point-of-purchase material will tie-in with a national advertising program in *Beauty Fashion*, *Vogue* and *Harper's Bazaar*.

Pine Green Lifebuoy goes national

With a year's successful test marketing behind it in Ohio, new Pine Green Lifebuoy is now being marketed nationally as the first quality pine scented soap at popular prices. Spot and network TV schedules along with extensive print advertising will back up the introduction.

Market tests indicated that sales gains were twice as great where Coral, White and Pine Green bars were offered compared with areas in which White and Pine Green only were marketed. Lever Brothers has,

therefore, dropped plans to substitute Pine Green for the familiar Coral Lifebuoy.

Hudnut and Du Barry sales shifted by Warner-Lambert

Richard Hudnut products will be sold and distributed through the Warner-Lambert Products Division instead of through the Richard Hudnut subsidiary after April first. At the same time the company has created the DuBarry Division to market all DuBarry beauty preparations and fragrances, Ciro perfumes and fragrance preparations, and men's grooming products under the Sportsman label. E. Lloyd Bernegger is president of the Warner-Lambert Products Division and Walter P. Kuenstler has been named executive vice president of the DuBarry Division.

Leuders honors Dittrich and Noguera

Alfred Dittrich and Berardo Noguera were recently admitted to the George Leuders & Company Twenty-Five Year Club and honored at luncheons attended by the 65 club members. The new members received gold wrist watches and gifts from officials and fellow employees.

Les Parfums Jacques Fath forms American company

Nicholas Baker has been appointed director of the newly formed Les Parfums Jacques Fath in United States and Canada. Executive offices and showroom are located at 5 East 57th Street. Other appointments include Mrs. Roscella McQueen Lightner, office manager; William F. Don-

egan, midwest sales manager; Alice Leeper, promotional representative for the west coast; William H. Russell, representative; Jill Jesse, Inc., advertising and publicity agency.

Four Jacques Fath fragrances are to be promoted: Canasta, Fath de Fath, Fath's Love and Green Water. A full advertising campaign is planned in fashion magazines for this fall.

"Soap, Perfumery & Cosmetics" editor wins international prize

F. V. Wells, consulting chemist and editor-in-chief of *Soap, Perfumery & Cosmetics*, London, England, has



F. V. Wells, editor-in-chief of "Soap, Perfumery & Cosmetics", London, England, was awarded the "Giuliana Brambilla" prize in recognition of his role of educator of the industry through the medium of the technical press.

been awarded the "Giuliana Brambilla" prize for creative contributions to the cosmetological and dermatological fields. Wells is the fifth win-

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ner of the award which is sponsored by Laserson & Sabetay Company, La Garenne-Colombes, France. It was given to George Dumont, Bursselse in 1957, Dr. Paolo Rovesti, Milan in 1958 and to Louis Schmuck, Paris in 1959. Dr. H. C. Friedrich, Tubingen, Germany, won it last year.

Wells is an active and honorary member of both European and American cosmetic and perfumery societies. He was the founder and first president of the Society of British Cosmetic Chemists.

New officers at Beauty Counselors

Four new officers have been elected by the board of directors of Beauty Counselors, Inc., Grosse Pointe, Michigan. They are: Maison G. de Navarre, vice president in charge of research and development, who is also editorial director of AMERICAN PERFUMER; George A. Hagan, vice president in charge of operations; James G. Miller, assistant vice president in charge of purchasing; and Harry P. Walker, treasurer.

Abrac appoints Compagnie-Parente

A. Boake, Roberts & Co., Ltd., of London have appointed Compagnie Parente, Inc. of New York, as agents

for the company's line of Abrac pure perfumery chemicals. Compagnie-Parente will represent the Aromatics Division of Abrac throughout the United States on specialty products, in addition to their perfume chemicals.

PERSONALITIES

Oscar Kolin, vice president and director of the international cosmetics firm of Helena Rubenstein, is co-chairman of the 1961 New York March of Dimes.

Kolin will also serve as chairman for the drive in the cosmetics industry.

Isidore Bronfein is now senior research chemist at The Mennen Company, Morristown, New Jersey. He has, since 1952, been working with cosmetic and toiletry formulation as chief chemist for two contract manufacturers. Prior to that he worked in industrial chemistry for twelve years with Roure Dupont, New York City.

William Deitenbeck now fills the post of director of sales promotion for Viviane Woodard Cosmetics, Panora-



George L. Schultz (left), president of Shulton, Inc., presents a certificate of identification to Herman C. Nolen, president and chief executive officer of McKesson & Robbins, Inc. The certificate which identifies a wholesaler as a franchised distributor of Shulton toiletries was accepted by Mr. Nolen in behalf of those divisions of McKesson & Robbins which act in this capacity. Similar certificates have been issued by Shulton to all their franchised wholesale drug concerns.

ma City, California. He joined the national direct selling cosmetic firm last July as director of public relations.

D. J. Olsen is new general manager, manufacturing at Lehn & Fink Products Corporation, New York City. He succeeds Edmund J. Dempsey, retired. In Toledo, Ohio, Robert E. Dickens is new general sales manager of the firm's professional division, National Laboratories, Inc., a wholly-owned subsidiary.

William Bryce Lorth is representing the AR-EX (Chicago) line of hypo-allergenic cosmetics and dermatological pharmaceuticals in Texas and Louisiana.

John P. Gleason is manager of the Washington office, Owens-Illinois Glass Company, 1627 K Street, N.W., succeeding Walter G. Thomas who retires after 33 years with the company. Gleason, who spent nine years as a special agent for the FBI and four years in the State Department foreign service, joined Owens-Illinois in 1950.

K. J. Morray succeeds Thomas J. March as sales manager of the Silicone Products department of the Gen-

eral Electric Company, Waterford, New York.

David M. Ward, recently named assistant national sales manager of the toiletries division of Shulton, Inc., New York City, will serve as liaison between the toiletries and home products divisions. He joined Shulton in 1954 as a sales representative.

At the firm's new Memphis, Tennessee plant John T. Wilson takes over as southwest regional sales manager moving that office from its previous headquarters in Dallas.

Charles E. O'Rourke is now product manager in new chemicals marketing for Union Carbide Chemicals Co., New York City. He will handle fine and food chemicals.



David J. Smith, Jr. has joined the International Division of Chesebrough-Pond's Inc. as vice president in charge of European operations. Mr. Smith, who was formerly director of sales and a director of Revlon International Companies, will make his headquarters in Geneva, Switzerland.



Paul Bremer, formerly general manager of Christian Dior Perfumes Corporation, has been elected president of the American company. Mr. Bremer has been with Christian Dior Perfumes since September 1958.

C. A. Bergman is new market manager of chemicals, General Dyestuff Company, Div. of General Aniline & Film Corp., New York City.



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INDUSTRY EVENTS CALENDAR

April 10-13—National Packaging Exposition and Conference, McCormick Place, Chicago, Ill.

April 11—Chicago chapter of the Society of Cosmetic Chemists, Henrici's restaurant, Merchandise Mart. Speaker: Dr. Alfred E. Brown, "Methods of Selecting Identifying and Stimulating Creative Scientists." Social Hour, 5:30; Dinner, 6:30; Meeting, 7:30. (see story on page 72 this issue.)

April 11—Chicago Perfumery, Soap and Extract Assoc., Inc., (Ladies Dinner Party) Furniture Club of America, 666 Lake Shore Drive, Chicago.

April 12—New York Chapter of the Society of Cosmetic Chemists (Annual Ladies Night). Speaker: Dr. Veronica L. Conley, "Observations among doctor's wives and nurses on attitudes to cosmetic advertising." (See story on page 72.)

April 12—The Society of Cosmetic Chemists, Semi-annual Spring Meeting, Hotel Biltmore, New York City. (See story on page 72 this issue.)

May 1-3—American Oil Chemists' Society, 52nd Annual Meeting, Sheraton-Jefferson hotel, St. Louis.

May 9-11—The Toilet Goods Association (26th Annual Convention) Waldorf-Astoria hotel, New York City.

May 23—Chicago Perfumery, Soap and Extract Association, Inc. (Par-Busters' Golf Outing, River Forest Country Club, Elmhurst, Ill.)

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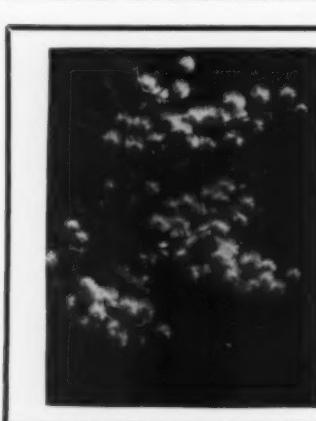
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